Five-Year Review Report

Fourth Five-Year Review Report
For
The Western Sand and Gravel Superfund Site
Burrillville and North Smithfield
Providence County, Rhode Island 02895

September 2008

Prepared by:
The United States Environmental Protection Agency
Region 1, New England
Boston, Massachusetts

EPA
New England

Approved by:

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Date: 9/25/08

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Five-Year Review Report

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LIST OF ACRONYMS AND ABBREVEATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
CAMU	Corrective Action Management Unit
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	Contaminants of Concern
CWA	Clean Water Act
EPA	United States Environmental Protection Agency
CFR	Code of Federal Regulations
DWS	Drinking Water Standard
ESD	Explanation of Significant Difference
GRI/FS	Groundwater Remedial Investigation/Feasibility Study
ICL(s)	Interim Cleanup Level(s)
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NCP	National Contingency Plan
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NPL	National Priorities List
O&M	Operation and Maintenance
ORD	Office of Research and Development
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PCE	Tetrachloroethene
PRP	Potentially Responsible Party
PSD	Performing Settling Defendant
RA	Remedial Action

RAGS	Risk Assessment Guidelines
RAO	Remedial Action Objective
RD	Remedial Design
RfC	Reference Concentration
RfD	Reference Dose
RI/FS	Remedial Investigation/Feasibility Study
RIDEM	Rhode Island Department of Environmental Management
ROD	Record of Decision
SDWA	Safe Drinking Water Act
TCE	Trichloroethene
VOC	Volatile Organic Compound

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EXECUTIVE SUMMARY

The purpose of this five-year review is to determine whether the remedial actions at the Western Sand & Gravel site, located primarily in Burrillville, and partially in North Smithfield, Providence County, Rhode Island (the Site) are protective of human health and the environment and functioning as designed. This five-year review is for the entire Site (OUs I, II and III). The United States Environmental Protection Agency (EPA), Region I, conducted this review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 122(a), NCP Section 300.400(f)(4)(ii), and OSWER Directive 9355.7-03B-P (June 2001). It is a statutory review. This is the fourth five-year review for the Site covering the years 2003 through 2008.

The Site was a sand and gravel quarry operation from 1953 until 1975. From 1975 to April 1979, a portion of the Site was used for the disposal of liquid wastes including chemicals and septic waste. Unpermitted wastes were disposed of at the Site and over time, some of the wastes penetrated the porous soil and contaminated the groundwater. In 1979, hazardous wastes were no longer accepted at the Site, and in March 1980 EPA conducted a removal action at the Site during which approximately 60,000 gallons of VOC-contaminated liquids were pumped from lagoons. In 1982, the Rhode Island Department of Environmental Management (RIDEM) began a groundwater recirculation system in an effort to control the spread of groundwater contamination. In September 1983, the EPA added the Site to the CERCLA National Priorities List (NPL).

EPA has issued three Records of Decision (ROD) for this Site. Under the first ROD (1984), water filters were installed on private wells until a permanent water supply system was constructed to serve the affected area (approximately 56 parcels) in 1992. The second ROD (1985) addressed contaminated soils at the Site. Contaminated soils were excavated and consolidated in a designated area within the Site. A RCRA Subtitle C cap was installed over the two-acre soil disposal area in 1987. This area of the Site was graded, and the cap and graded area were fenced and posted with warning signs. The fenced area of the Site comprises approximately six (6) acres. Post-closure monitoring and inspections of the cap and graded Site areas are ongoing. EPA issued the third ROD in 1991 to address groundwater contamination. The groundwater remedy selected for the Site is monitored natural attenuation until interim cleanup levels have been met, site monitoring and institutional controls. In addition, the 1991 ROD includes a contingency remedy for active pump and treat, which takes effect in the event that natural attenuation does not occur at the predicted rate.

The assessment of this five-year review found that the remedies continue to function as designed. The water supply system is operated and maintained safely. The landfill cap is in excellent condition and is being well maintained. Finally, the groundwater data collected as part of OU III indicates that natural attenuation is progressing and there is no need to consider active remediation at this time. Because the remedial actions at all the Operable Units (I, II, and III) at the Western Sand and Gravel Site are protective, the Site is protective of human health and the environment.

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Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: Western Sand & Gravel		
EPA ID: RID009764929		
Region: 01	**State:** RI	**City/County:** Burrillville and N. Smithfield, Providence Cty

SITE STATUS	
NPL status: Final	
Remediation status: OU 1 and OU 2 complete. OU 3, monitored natural attenuation is underway.	
Multiple OUs? YES	**Construction completion date:** 12/22/1992
Has Site been put into reuse? YES	

REVIEW STATUS	
Lead agency: EPA	
Author name: Gerardo Millán-Ramos	
Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA, Region 1 - New England
Review period: October 2003 to September 2008	
Date(s) of Site inspections: March 20, 2003; September 25, 2003; March 16, 2004; September 24, 2004; March 31, 2005; September 29, 2005; March 29, 2006; September 21, 2006; April 4, 2007; October 4, 2007; April 2, 2008; and March 28, 2008.	
Type of review: Post-SARA	
Review number: 4 (fourth)	
Triggering action: Previous Five-Year Review Report	
Triggering action date *(from WasteLAN)*: 09/26/2003	
Due date *(five years after triggering action date)*: 09/26/2008	

Five-Year Review Summary Form, cont'd.

Issues:

(1) The OU III ROD requires a statistical trend analysis for only four indicator compounds rather than for all groundwater contaminants with ICLs that are currently being detected.

(2) On April 2007, the maximum concentration for PCE was extremely high (49 μg/L) from a split sample for well C4S. It is unclear whether this was in fact an accurate measurement or an error associated with field and/or analytical procedures.

(3) Recent guidance generally requires lines of evidence beyond the current statistical approach being used to support the performance of the natural attenuation remedy at this Site.

Recommendations and Follow-up Actions:

(1) An evaluation of all detected groundwater contaminants with site-specific ICLs is needed.

(2)(a) Additional attention is needed to sampling and analytical QA/QC procedures for all groundwater monitoring wells, but in particular, well C4S.

(2)(b) Perform field audits during the next several sampling rounds to determine if more frequent sampling is needed.

(3) The current statistical performance criteria should be reviewed in light of recent guidance on monitoring the performance of natural attenuation remedies.

Protectiveness Statement(s):

OU I involved the construction of a water supply system to provide residents in the affected area with a permanent supply of safe drinking water. The water supply system has been in operation since September 1994. The remedy at OU I is protective of human health and the environment.

OU II involved the consolidation of contaminated soils to the cap area and construction of an impermeable barrier over the consolidated contaminated soils. The OU II remedy continues to minimize the continued release of contaminants to the groundwater and prevents public exposure to the contaminated soils. The remedy at OU II is protective of human health and the environment.

OU III relies on institutional controls to prevent the use of groundwater in the affected area, and monitored natural attenuation of contaminated groundwater (with a contingency for active pump and treat). It was originally projected that natural attenuation would require 24 to 28 years to achieve the target cleanup concentrations. As evidenced by the concentration trends of the four indicator compounds and the statistical analysis performed, natural attenuation is taking place and, at this time, there is no need for active pump and treat. The remedy at OU III is expected to be protective upon completion and in the interim, exposure pathways that could result in unacceptable risks are being prevented by institutional controls and the availability of a public water supply system in the area.

Site Wide Protectiveness Statement

Overall, because the remedial actions at all OUs at the Western Sand and Gravel Site are protective, the Site is protective of human health and the environment.

Other Comments:

There are no additional comments at this time.

1.0 INTRODUCTION

The purpose of the five-year review is to determine whether the remedies at a site are protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The United States Environmental Protection Agency, Region 1 (EPA), conducted this five-year review of the remedial actions implemented at the Western Sand and Gravel (WS&G) Site (hereinafter referred to as the Site), located on Douglas Pike (also known as Route 7), on the boundary of Burrillville and North Smithfield, in Providence County, Rhode Island. This review was conducted in accordance with OSWER Directive 9355.7-03B-P, "Comprehensive Five-Year Review Guidance" (June 2001).

This is the fourth five-year review for the Site. The triggering action for this statutory review was the approval date of the 2003 Five-Year Review Report. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

2.0 SITE CHRONOLOGY

The chronology of significant Site events and dates is included in Table 1.

Table 1 - Chronology of Site Events

Event	Date
Site operated as a sand and gravel quarry.	1953 to 1979
Approximately 12 acres of the Site used for disposal of liquid wastes.	1975 to 1979
Joint meeting of Burrillville and North Smithfield Town Councils to discuss concerns about Western Sand and Gravel Site.	January 1979
RI Department of Health begins sampling of nearby wells.	February 1979
RIDEM sends Western Sand and Gravel a Notice of Violation for violation of water and air pollution regulations, odors and for failing to prepare complete and accurate industrial waste manifests.	February 1979
RIDEM issues Cease and Desist Order.	April 24, 1979
Under Consent Agreement with RIDEM six groundwater monitoring wells installed and sampled and tested positive for toluene, xylene, chloroform, 1,1,1-trichloroethane, trichloroethene, tetrachloroethene, and dichloromethane.	November 1979
RIDEM issues a Consent Decree, a Show Cause Order on Closure, and a Final Closure Order for pumping chemical wastes from the lagoons.	November 1979
EPA pumps out lagoons.	1980
RIDEM installs groundwater re-circulation system.	November 1982
Final Listing on the NPL.	September 8, 1983
OU 1 RI/FS Complete	September 28, 1984
OU I Final ROD (Waterline)	September 28, 1984
OU II RI/FS Complete.	September 30, 1985
OU II Final ROD (Capping)	September 30, 1985
Approximately 45 PRPs entered into a Consent Decree to pay EPA for the estimated cost of the waterline construction and perform all the other activities required in the OU I and OU II RODs.	June 5, 1987
OU II Remedial Design Complete	June 12, 1987
OU I Remedial Design Complete	March 29, 1989

Event	Date
OU III RI/FS Complete	April 16, 1991
OU III – Final ROD (nnatural attenuation w/ contingency for pump & treat)	April 16, 1991
Five PRPs enter into a Consent Decree to perform OU III remedy	February 21,1992
Administrative Settlement with one PRP that failed to join the 1992 CD	August 11, 1992
Preliminary Close-Out Report	December 22,1992
First Five Year Review	December 23, 1992
OU III Natural Attenuation Design Complete	February 1, 1993
OU I Remedial Action Complete	September 26, 1994
Second Five Year Review	July 9, 1998
Prospective Purchaser Agreement with Supreme Mid-Atlantic Corporation	October 2001
Third Five Year Review	September 26, 2003

3.0 BACKGROUND

3.1 Physical Characteristics

The Site, is located on the boundary of Burrillville and North Smithfield, in Providence County, Rhode Island. A map depicting the general location of the Site is provided in the Site Vicinity Map of Appendix A. The Site consists of approximately 25 acres of land and is located in an area generally described as being semi-rural. The general layout of the Site is shown on the Base Map in Appendix A.

The Site is located over the Slatersville Aquifer that has been designated as a drinking water source by the State of Rhode Island. Other potentially environmentally sensitive areas near the Site include Tarkiln Brook and the Slatersville Reservoir, both of which are classified as Class B water bodies. According to the Rhode Island Water Quality Standards, Class B water bodies are suitable for fishing, swimming, and other recreational purposes. There is also a wetland area near the Site that borders Tarkiln Brook.

Residential areas are located to the west and north of the Site, with the nearest residence being approximately 1,000 feet northwest of the Site. Groundwater has also been confirmed to discharge into Tarkiln Brook and the Slatersville Reservoir. No residential or commercial structure lies on top of the plume of groundwater contamination, hence no vapor intrusion issues are suspected.

3.2 Land and Resource Use

The Site was operated as a sand and gravel quarry from 1953 until 1979. From 1975 to April 1979, a portion of the Site was used for the disposal of liquid wastes including chemicals and septic waste. Contents of tank trucks were emptied directly into open lagoons and pits, none of which were lined with protective materials. Over time, some of the wastes penetrated the porous soil and contaminated the groundwater.

In October 2001, a Prospective Purchaser Agreement between EPA – Region 1 (New England) and Supreme Mid-Atlantic Corporation (Supreme) was signed. Supreme purchased the entire 25-acre Site. The use of the capped portion of the Site (approximately 6 acres), the rest of the Site, and the use of the groundwater within the Site, is limited by the implementation of all necessary institutional controls. The following is a list of the institutional controls (for both land and groundwater) currently in place at the Site:

1. Declaration of the Restrictions and Protective Covenants Imposed Upon the So-called Western Sand & Gravel Hazardous Disposal Site. Executed on April 23, 1986, before Notary Public in Providence Rhode Island.
2. Declaration of Groundwater Use Restrictions and Protective Covenants. Executed on March 27, 1991, before Notary Public in Dannellon, Florida.
3. Declaration of Groundwater Use Restrictions and Protective Covenants. Executed on August 23, 1991, before Notary Public in Providence, Rhode Island.
4. Institutional Control Agreement Western Sand and Gravel Superfund Site, Burrilville and North Smithfield, Rhode Island. Executed on September 3, 1991, before Notary Public in New York, New York.
5. Declaration of Groundwater Use Restrictions and Protective Covenants. Executed on December 26, 1995 at the Land of Evidence Records for the Towns of North Smithfield and Burrilville, Rhode Island.
6. Confirmatory Declaration of Groundwater Use Restrictions and Protective Covenants. Executed on June 5, 1996, before Notary Public in Cranston, Rhode Island.

Electronic copies of all the institutional control documents are available at the Superfund Site Profile in EPA's national Superfund website. The following is a link to the webpage:
http://www.epa.gov/ictssw07/public/export/01/RID009764929/RID009764929_report.HTM

Hard copies are also available at the Burrillville Town Hall, 105 Harrisville Main Street, Harrisville, RI 02830, and the EPA New England Records Center, One Congress Street, Boston, MA 02114

The land south of the capped portion of the Site (approximately 19 acres) is currently being operated by Supreme as a truck body assembly plant. The 19 acre area that has already been developed is generally upgradient of the impacted groundwater.

3.3 History of Contamination

From 1975 to April 1979, a portion of the Site (approximately 12 acres) was used for the disposal of liquid wastes including chemicals and septic waste. Contents of tank trucks were emptied directly into open lagoons and pits, none of which were lined with protective materials. Initially the Site was only permitted to accept sewage wastes. Over time, the wastes disposed of at the Site included chemical wastes that eventually penetrated underlying porous soils and contaminated the groundwater. The total volume of materials disposed of at the Site is unknown. RIDEM records indicate that approximately 470,000 gallons of waste were deposited at the Site during its last year of operation.

A fire occurred in one of the chemical pits in March 1977. At that time, local fire officials ordered the Site owner and operator to remove the chemicals from the waste pit. Reportedly, the Site owner responded by burying the contents from the waste pit on-site. It was also during 1977 that nearby residents began complaining about odors from the Site. During February 1979, due to concerns regarding local water supplies, nearby wells were sampled by the Rhode Island Department of Health (RIDOH).

3.4 Initial Response

In 1979, the Rhode Island Department of Environmental Management (RIDEM) issued a Cease and Desist Order for violations of water and air pollution regulations at the Site.

In 1980, EPA performed a removal at the Site during which approximately 60,000 gallons of VOC-contaminated liquids were pumped and removed from the lagoons. This action was taken under the authority of Section 311 of the Clean Water Act, prior to the passage of CERCLA.

The Site was proposed for listing on the NPL in October 1981, with final listing on the NPL in September 1983.

In 1982, RIDEM as the lead Agency, began a groundwater recirculation system in an effort to control the spread of groundwater contamination. RIDEM and EPA conducted RI/FS studies at the Site during 1982 to 1985 for OUs I and II.

3.5 Basis for Taking Action

In September 1984, RIDEM completed the first RI/FS for the Site under a cooperative agreement with EPA. The conclusions of the RI were as follows:

- Organic chemicals had infiltrated through highly permeable soil into the groundwater.
- Organic chemicals had migrated from the Site through the upper fractured bedrock and residential wells down gradient from the Site were contaminated.
- Contamination had migrated to and had affected the quality of drinking water in nearby

residential wells.

- Contaminated groundwater had discharged into nearby Tarkiln Brook and Slatersville Reservoir.
- Contaminated soil and sludge existed in various locations on the Site.
- Hazardous air emissions were not detected at the Site.

Action was taken at the Site, in accordance with the 1984 OU I ROD and 1985 OU II ROD, since both human and environmental receptors existed and could potentially be exposed to contaminants occurring at concentrations in excess of state and Federal standards. The primary exposure to Site contamination would be through direct contact and/or ingestion of soils, sludges, and sediments in waste basins/lagoons and areas immediately adjacent to the waste basins/lagoons; direct contact and/or ingestion of surface water; and ingestion of contaminated groundwater.

In addition, the 1991 ROD for OU III listed the following primary contaminants of concern in groundwater that warranted action:

Organics

benzene, chlorobenzene, toluene, xylenes, 1,1,1-trichloroethane, trichloroethene, tetrachloroethene, 1,2-dichloroethane, 1,1-dichloroethane, and vinyl chloride.

Inorganics
arsenic, chromium, and lead.

For a complete list of all the COCs listed in the ROD for OU III and their respective Groundwater Interim Cleanup Levels, please see Appendix H.

4.0 REMEDIAL ACTIONS

4.1 Operable Unit 1 Remedy Selection/Implementation

In September 1984, EPA issued the first ROD for the Site with the following remedial objectives:

- To provide residents in the affected area with a permanent supply of safe drinking water.
- Abate local sources of contamination at the Site.
- Minimize future public health risks by restricting site access.

To achieve these objectives the ROD specified:

- The installation of water filters as an Initial Remedial Measure (IRM) to provide protection for homes where contaminants were identified in their wells, until the permanent alternate water supply became functional.
- The installation of a permanent alternate water supply to service approximately 56 parcels of land.

Starting in August 1984, Olin Hunt Specialty Products, Inc. (Olin), a potentially responsible party (PRP) at the Site, installed water filters in private homes with contaminated wells and in homes that might become contaminated. EPA began construction of the permanent water supply system in April 1990. The water supply system became operational and functional in September 1994.

4.2 Operable Unit 2 Remedy Selection/Implementation

In September 1985, EPA issued a second ROD for the site with the following additional remedial objectives:

- Contain or remove sources of contamination at the Site to minimize the continued release of contaminants to the groundwater and future public exposure and health impacts.
- Mitigate the environmental impact of contaminated groundwater.

To achieve these objectives the ROD specified:

- The grading of contaminated soil to the cap area.
- The installation of an impermeable cap consistent with RCRA provisions.
- The phasing out of the groundwater recirculation system, and the removal and disposal of the associated equipment.
- The final grading of the Site with loam and the seeding of the cap and surrounding surface.
- The securing of the Site with a fence and posting of the Site.

This ROD also required the following operation and maintenance activities:

- The inspection and maintenance of the cap, fence, and postings consistent with RCRA provisions.
- Continued groundwater monitoring consistent with RCRA post-closure provisions.

Construction activities for OU II were complete by March 1989. All contaminated soils were excavated and consolidated under approximately 2-acres of impermeable cap (RCRA C). The Site was graded and the cap and graded area were fenced and posted with warning signs. The fenced area comprises approximately 6-acres of the 25 acre Site. Post-closure monitoring and inspections of the cap and graded areas are ongoing.

4.3 Operable Unit 3 Remedy Selection/Implementation

In April 1991, EPA issued the third and final ROD for the Site with the following remedial objectives:

- Restore contaminated groundwater in the overburden aquifer, from the boundary of the existing cap to the outer boundary of the contaminant plume, to state and federal ARARs, including drinking water standards, and to a level that is protective of human health and the environment as soon as practicable.
- Restore contaminated groundwater in the bedrock system, to state and federal ARARs, including drinking water standards, and to a level that is protective of human health and the environment as soon as practicable unless EPA determines, based on additional information, that contamination in the bedrock does not exceed protective levels.
- Protect uncontaminated groundwater and surface water for current and future use.
- Prevent human and animal exposure to contaminated groundwater.
- Protect environmental receptors.

To achieve these objectives the ROD specified:

- Reliance on natural attenuation of contaminated groundwater with a contingency to perform active restoration. According to the hydrogeologic models, groundwater is expected to be restored to the interim cleanup levels in approximately 24 to 28 years. Active restoration, for which a work plan has been developed, will be implemented, according to the ROD, if natural attenuation is not restoring the groundwater at a rate predicted by modeling or faster.
- Utilization of institutional controls to reduce the risk to public health from consumption of groundwater.
- Implementation of a Site monitoring program to include long term monitoring of the groundwater.

The interim cleanup levels for four indicator compounds were established for the Site to determine if natural attenuation was working, using the nonparametric signed rank test of Wilcoxon, as predicted by the model or faster. These four indicator compounds and their respective interim cleanup levels are presented below:

Benzene	5 µg/L
Vinyl Chloride	2 µg/L
Trichloroethene	5 µg/L
Tetrachloroethene	5 µg/L

Specifications for performance of periodic evaluations of the natural attenuation remedy were initially identified in the 1993 Site Monitoring Plan. Submittal of the first evaluation was completed in accordance with the Site Monitoring Plan and Consent Decree Statement of Work and was presented in Appendix E to the 1994 Data Report, dated February 1995. The evaluation showed that the statistical test passed without considering outliers for the indicator compounds tetrachloroethene, trichloroethene, and vinyl chloride. The report made recommendations regarding treatment of outliers for the indicator compound benzene and a further recommendation regarding modification of the benzene theoretical curve based on new information derived from a recent review of the groundwater modeling assumptions and modeling parameters reported in the literature.

Following submission of the 1994 Data Report, three consecutive quarters of benzene maximums at or below the theoretical curve had been achieved. However, for the period December 1995 through December 1996, three of the five quarters were above the theoretical curve for benzene. As a result, and consistent with Section III(A)(1)(a)(3), page 7 of the Consent Decree Statement of Work, another periodic evaluation and data report was completed and submitted to EPA in April 1997. That evaluation identified proposed changes to the Wilcoxon statistical test, which were consistent with the language and intent of the OU III ROD.

The 1997 proposal for modification of the statistical test received EPA concurrence in the course of the development of the Five-Year Review, Type 1A, for Operable Unit No. 3 (April 1998). With this modification, the need for active remediation would be implemented only if both of the following conditions are met for any of the four indicator compounds:

- In applying the Wilcoxon Rank Sum Test, the null hypothesis is rejected in favor of the alternative hypothesis that attenuation is occurring at a rate slower than predicted by the theoretical curve. This will occur if $T^+ \geq t(\alpha, n)$, and

- Least squares regression fails to identify a statistically significant negative slope at the 95 percent confidence level.

Implementation and monitoring of the remedy under OU III – natural attenuation – has continued to be performed on a biannual basis since 2001.

4.4 System Operations/Operation and Maintenance (O&M)

The water supply system (implemented in accordance with the OU I ROD) is operated and maintained by a privately owned water district (Nasonville Water District). The RIDOH is responsible for ensuring that the water supply system is being operated and maintained properly and remains protective of human health.

The PRPs have continued to conduct routine system operations/O&M that has consisted of Site inspections and general maintenance of the grounds and the landfill cap. In addition, the PRPs continue to monitor the performance of the remedy based on groundwater sampling events. Quarterly progress reports and annual data reports have been submitted to the EPA for the years cited below. All O&M activities during the five-year review period were conducted during the regular sampling events as noted below:

2003	2004	2005	2006	2007
March 2003	March 2004	March 2005	March 2006	April 2007
September 2003	September 2004	September 2005	September 2006	October 2007

Since the remedy relies on natural attenuation of contaminated groundwater to achieve the goals set forth in the ROD, an annual data review is also conducted to assess whether the remedy performance standards are being satisfied.

5.0 PROGRESS SINCE THE LAST REVIEW

In the third Five-Year Review, dated September 2003, EPA certified that the remedy selected for this Site remains protective of human health and the environment. Since the concentrations of the four indicator compounds were decreasing at the rate predicted by the theoretical curve, or faster, it was recommended that the natural attenuation remedy be allowed to continue. The 2003 five-year review also identified a couple of issues and provided concrete recommendations to address those issues. The issues identified were that tree growth was observed on and around the cap, and that the staff gauges were not readable. As evidenced by the Site inspections listed in Section 6.5 herein, these recommendations were successfully completed since the last Five-Year Review.

5.1 Monitoring Program Modifications

During the course of the previous five-year review period, EPA and RIDEM were petitioned by the PRPs to decrease the number of wells sampled and the frequency that the wells were sampled. This request was made since the four indicator compounds continued to decrease at the rate predicted by the theoretical curve. The proposed modifications were considered in no way to impact the ongoing routine monitoring program and the evaluation of the effectiveness of the remedial action. The proposed changes to the remedial program included the following:

- Temporary sealing and/or permanent abandonment of selected onsite wells;
- Reduction in the frequency of the groundwater sampling schedule; and
- Reduction in the frequency of the collection of hydrogeologic monitoring data.

EPA and RIDEM approval of the requested program modifications was granted (correspondence dated August 7, 2001) with the following exception:

- The wells that were initially proposed to be permanently abandoned will instead be temporarily sealed as approved, using the same specifications for temporary modification as detailed in previous correspondence.

Subsequently, well sampling beginning in September 2001 was conducted in accordance with the EPA approval in the reduction of sampling frequency and locations. Specifically, samples were not collected from twenty-two (22) of the previously required locations during the biannual sampling event. The sampling locations approved for elimination from the groundwater monitoring program included the following:

I1S, I1M, I1D, I5S, I5M, I5D, I8S, I8M, I8D, II2S, II2M, II2D, II4S, II4M, II4D
II5S, II5M, II5D, II6S, II6M, II6D, and II7S

Temporary well sealing was completed at the Site during the March 2002 and September 2002 monitoring events in accordance with approved specifications.

6.0 FIVE-YEAR REVIEW PROCESS

6.1 Administrative Components

The Western Sand & Gravel site's five-year review team was led by Mr. Gerardo Millán-Ramos, EPA Region 1 Remedial Project Manager for the Site. The review components included:

- site inspection;
- data review;
- review of annual data reports;
- review of site inspection reports;
- development and review of the Five-Year Report.

Soon after the review and approval of this five-year review report, a notice will be placed in a local paper announcing that the five-year review report is complete and that it is available to the public at the Site repositories as listed below:

Burrillville Town Hall
105 Harrisville Main Street
Harrisville, Rhode Island 02830

EPA – Region 1 (New England) Records Center
One Congress Street, Suite 1100
Boston, Massachusetts 02114-2023

6.2 Community Notification and Involvement

During this five-year review period, there were no public hearings or public meetings. Community involvement activities during the five year review period were limited to the submission of the annual data reports to the local and federal repositories listed above (i.e., the Burrillville Town Hall and the EPA – Region 1 New England Records Center).

A public notice was published in The Call, a local newspaper in Woonsocket, Rhode Island, on Wednesday March 5, 2008. The notice indicated that EPA had begun the fourth Five Year Review of the Site. It summarizes the cleanup measures taken at the Site and provides contact information for the public. For a copy of the public notice please see Appendix I.

RIDEM has continued to test groundwater wells in two nearby residences, as needed, during this five-year review period. Based on these tests, RIDEM has determined that these residences were not being impacted by contaminants of concern from the Site. Overall, the results of the analyses performed showed that the water is fit for general consumption. The single exception was a detection of lead at 39 ppb in one of the residences, on January 2003. This level exceeded the MCL (15 $\mu g/l$) and the property owner was advised by RIDEM that the water should not be consumed by children 6 years old or younger. RIDEM provided information about water treatment options and recommended the installation of a sediment filter, as, at the time of sampling, sediment was observed in the sample. Recently, it was reported that the homeowner has subsequently installed a sediment filter. Finally, it should be noted than in two subsequent sampling rounds (October 2004 and June 2006), lead was not found above the method detection limit or the MCL.

6.3 Document Review

This five-year review consisted of a review of relevant documents including the three RODs; the 1992, 1998, and the 2003 Five-Year Review Reports; annual data reports, inspection reports, and a review of current regulatory guidelines (state and federal) to verify any changes in standards with respect to the remedy

6.4 Data Review

All new residential and commercial development in the Site vicinity is required to be connected to the public water supply. As noted above in Section 6.2, RIDEM continues to test nearby residential wells, as-needed, with the most recent results from one residence showing no MCL exceedances

Ongoing tasks associated with OU II include regular inspection and monitoring of the landfill cap during routine Site monitoring events. During this five-year review period, the integrity of the cap remained intact. Minor woody vegetation observed on the cap and along the cap fence line was removed as necessary.

Tasks for OU III include ongoing groundwater monitoring for select wells at the Site, Site inspections, and annual reporting of results. Groundwater flow throughout this five-year review period has been generally to the north, with groundwater ultimately discharging into Tarklin Brook. All piezometric data and groundwater flow maps that were generated during the 5-year period are presented in Appendix E.

Overall, the four indicator compounds (PCE, TCE, vinyl chloride and benzene) have been assessed since 1998 by applying the following analyses to the groundwater data:

- the Wilcoxon Rank Sum Test, and
- least squares regression.

As described previously in more detail in Section 4.3, should these two statistical tests fail, the need for an alternative (*i.e.*, more proactive) remedy would need to be implemented.

Laboratory analytical results for this five-year review period are summarized below with respect to the four individual indicator compounds of concern. In addition, Appendix B contains the analytical results for each of the groundwater monitoring wells tested at the Site and Appendix C contains the statistical analysis results for the four indicator compounds from 1989 to present.

<u>Benzene</u>
Benzene actual maximum concentrations did not exceed the theoretical concentration (defined from the 1993 groundwater modeling) of 5 μg/l during this five-year review period. During the last two sampling events for this five year review period (April and October 2007), the actual maximum benzene concentration detected was 1.0 micrograms per liter (μg/l) and 2.0 μg/l respectively. Additionally, benzene passed the Wilcoxon Rank Sum Test and a significant negative slope for the least squares regression for benzene was observed in the data.

<u>Tetrachloroethene (PCE)</u>
PCE actual maximum concentrations exceeded the theoretical concentration five times during this five-year review period (March 2004, March 2005, and March 2006, September 2006, and April 2007). While the first three exceedances were very slight (1- 4 μg/l), the actual maximum concentrations in September 2006 (33 μg/l) and April 2007 (49 μg/l) were approximately 2.5-3 times higher than the theoretical concentrations. However, in October 2007, the PCE maximum

concentration was found to be 9 μg/l which was below the theoretical concentration for that month (11μg/l). Given the unprecedented nature of such high concentrations for PCE in September 2006 and April 2007, it is unclear whether analytical and/or field error may have contributed to these inconsistent detections. Additionally, PCE continued to pass the Wilcoxon Rank Sum Test.

Trichloroethene (TCE)

TCE actual maximum concentrations exceeded the theoretical concentration five times during this five-year review period (March 2005, March 2006, September 2006, April 2007, and October 2007). Nonetheless, at two of these events (September 2006, and October 2007) the actual maximum concentration was equal to the theoretical concentration of 5 μg/l. At three of the other sampling events during this five-year review period (March 2004, September 2004, and September 2005), the actual maximum concentration remained at or below the declining theoretical concentrations of less than 5 μg/l. Additionally, TCE continued to pass the Wilcoxon Rank Sum Test.

Vinyl chloride

Vinyl chloride actual maximum concentrations exceeded the theoretical concentration of 2 μg/l six times during this five-year review period (March 2004, March 2005, March 2006, September 2006, April 2007, and October 2007). In fact, in March 2005, March 2006 and April 2007, the actual maximum concentrations for vinyl chloride were at 24 μg/l, 15 μg/l and 10 μg/l, respectively. In applying the Wilcoxon Rank Sum Test to the vinyl chloride data, the test failed during the last two annual data reporting periods (2006 and 2007) indicating that the concentrations of vinyl chloride are decreasing more slowly than projected by the theoretical curve established in the 1991 ROD. However, in applying a least squares regression to the vinyl chloride data for the Site, a negative slope is evident (see Appendix C) and thus the threshold for consideration of active remediation has not been exceeded.

Finally, isoconcentration maps for the years 2003 through 2007 (as presented in the annual reports during this five-year review period) are provided in Appendix D. These maps show the concentration contours for total volatile organics based on the single highest total volatile organic concentration detected in each well for all sampling events during the respective years. From these figures, one can see that the plume shape has changed over the past five years as each of the four indicator compounds gradually reaches their respective MCLs.

6.5 Site Inspection

Site inspections were conducted by the PRPs contractor during each of the groundwater sampling events conducted during 2003 (March, and September), 2004 (March, and September), 2005 (March, and September), 2006 (March, and September), and 2007 (April and October). Overall, there were no conditions identified that would compromise the remedy. The general maintenance activities included: replacement of rusted locks, maintenance of vegetation along fence lines; removal of young trees sprouting along the eastern side of the fence, re-insertion of the rail ends along the eastern side of the fence, and the re-seeding and mulching of sub-areas showing limited vegetation growth.

On March 28, 2008 EPA performed its Site Inspection. The cap was observed to be well maintained. There were no observed low spots or ponded waters, no erosion damage, and no observed animal burrows in the cap. Appendix G is a photographic summary of general Site conditions as observed during the most recent Site inspection.

6.6 Interviews

There were no interviews conducted during this five-year review period.

7.0 TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

YES. The remedy continues to function as intended by the three Records of Decision for the Site. In particular, the water supply system implemented as part of OU I is being operated and maintained safely. The landfill cap, installed as part of OU II, is in excellent condition and is being well maintained. Finally, the groundwater data collected as part of OU III indicates that natural attenuation is progressing and there is no need to consider active remediation at this time. However, during this five-year review period, the statistical analysis of the vinyl chloride data suggests that some uncertainty exists with respect to the continued progress of natural attenuation, and that the recent high groundwater detections of PCE requires more careful monitoring and analysis in the future.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?

NO. While the RAOs used at the time of the remedy selection remain valid, there have been changes in the MCL/MCLG and toxicity data for several compounds included in the OU III ROD. These changes were identified after a thorough review of the Interim Groundwater Cleanup Levels identified in the ROD for OU III (see Appendix H), against current MCLs/MCLGs, and the most current toxicity information. The following paragraphs describe such changes, a preliminary evaluation of the risks associated with the new standard or new toxicity information, and the potential impact these changes may have on the short term and long term protectiveness of the selected remedy for the Site.

<u>Chloroform:</u>
For chloroform, the current MCLG established under EPA's Safe Drinking Water Program (MCL = 80 µg/L, MCLG = 70 µg/L)[1] is more stringent than the Interim Ground Water Cleanup

[1] The MCL of 80 µg/L is applicable to total trihalomethanes, of which chloroform is but one trihalomethane.

Level identified in the ROD (MCL = 100 µg/L). This new final standard was published in the January 4, 2006 Federal Register.

The risk associated with the Interim Ground Water Cleanup Level of a 100 µg/L was evaluated using the most recent EPA policy, the IRIS 2001 oral assessment [RfD 0.01(mg/kg/day)-1], and the ATSDR MRL of 9.8 E-02 (mg/m3)-1 for chronic inhalation effects.

Assuming standard default residential exposure consumption patterns reflective of ingestion and inhalation exposure pathways for groundwater (2 l/day, 30 years, 70 kg, volatilization factor of 0.5 l/m3, continuous exposure to volatiles), the Interim Groundwater Cleanup Goal of 100 µg/L equates to a Hazard Quotient (HQ) less than unity (HQ = 0.8). Absent consideration of the cumulative effects of exposure to multiple compounds, this Interim Ground Water Cleanup Level is still consistent with the CERCLA goals for public health protection for non-carcinogenic effects (HQ less than or equal to unity). Thus, the Interim Groundwater Cleanup level remains protective, and this change has no bearing on the protectiveness of the remedy.

<u>1,1-dichloroethane, bromomethane, trichlorofluoromethane, naphthalene, and chloroethane:</u>

All of these compounds are either volatile or semivolatile and EPA now considers inhalation from use of a domestic water supply, a relevant pathway. Because of this reason, EPA has formally adopted inhalation reference concentrations which enables quantitation of a non-cancer hazard quotient resulting from inhalation exposures, and in the case of 1,1-dichloroethane, oral and inhalation carcinogenic potency estimates that allow the quantitation of cancer risk.

Based on these reference concentrations and/or carcinogenic potency estimates, EPA has re-evaluated the level of non-cancer hazard and/or cancer risk posed by the original Interim Groundwater Cleanup Level for each one of these compounds. These re-evaluations were made employing a standard residential exposure of 350 days/year for 30 years and a volatilization factor of 0.5 l/m3.

The following table lists the compounds, their original ICL, and the potential new ICL resulting from the hazard/risk evaluation:

COC	Original ICL per OU III ROD	Potentially new ICL
1,1-dichloroethane	3,500 µg/l	240 µg/l
bromomethane	35 µg/l	8.7 µg/l
trichlorofluoromethane	10,000 µg/l	1,300 µg/l
naphthalene	140 µg/l	6.2 µg/l
chloroethane	14,000 µg/l	1,460 µg/l

None of the ICLs (original or potentially new) impact the short term protectiveness of the selected remedy for the Site. This is due to the fact that currently there is no use of the groundwater as a domestic water supply and Institutional and Engineering controls remain in place to preclude use of the groundwater as a domestic water supply.

As to the long term protectiveness of the selected remedy, the contribution of the inhalation exposure may be significant if any of these compounds remains in the groundwater at a significant concentration. In actuality, the degree of significance of the residual chemical compound concentration and the long-term protectiveness of the remedy is dependent on the amounts and types of other groundwater constituents which also remain in the aquifer (as it is dependent upon the cumulative hazard posed by the residual contamination). It is the intent of EPA that at the conclusion of the remedial action, the long-term protectiveness goals of 10-4 to 10-6 will be attained for carcinogenic compounds and for non-carcinogenic compounds, the remedy will provide an adequate margin of safety from adverse effects based upon the cumulative hazard posed by the residual contamination.

There are a number of COCs for which the MCL or MCLG as established under EPA's Safe Drinking Water Program is now **less stringent** than the value used in the OU-III ROD. Because the new values are less stringent, it suggests that the Interim Groundwater Cleanup Levels for these compounds may provide for a level of public health protection that exceeds CERCLA program expectations. The following is a list of those compounds and their respective values:

Contaminant	OU-III ROD Interim GW Cleanup Level	MCL/MCLG value as of July 2008
Bis(2-ethylhexyl Phthalate	4 µg/L pMCL**	MCL = 6 µg/L
1,2,4-trichloro-benzene	9 µg/L pMCLG	MCLG/MCL = 70 µg/L
Barium	1,000 µg/L pMCLG	MCLG/MCL = 2,000 µg/L
Lead	5 µg/L pMCL	Treatment Technique @ tap = 15 µg/L,
Silver	90 µg/L sMCL*	sMCL* = 100 µg/L

* = secondary MCL
** = proposed MCL or proposed MCLG

Several of the original Interim Groundwater Cleanup Levels in the OU-III ROD were noted as being pMCLG or a "proposed" value. Several of these proposed values have now been adopted such that no changes to the values are warranted. This applied to the following compounds: chlorobenzene, 1,2-dichloroethae (cis), ethylbenzene, 1,1,2-trichloroethane, xylene, and 1,2,4-trichlorobenzene.

In the OU-III ROD, the basis for the Interim Cleanup Levels for di-n-butyl phthalate and for nickel were proposed MCLs or proposed MCLGs. EPA's Office of Safe Drinking Water however, has not promulgated MCLs or MCLGs for these compounds as of today. As such, only risk-based values would be appropriate today, and in both cases, the suggested risk-based values from the National Regional Screening Level for tap water for these two compounds, are in excess of the values noted in OU-III ROD (National Regional Screening Levels for residential tap water correspond to 3,700 µg/L for di-butyl phthalate and 730 µg/L for nickel). This suggests that the

Interim Groundwater Cleanup Levels for these compounds may provide for a level of public health protection that exceeds CERCLA program expectations.

The following is a list of compounds found in the OU-III ROD for which the **risk or hazard based toxicity value** is now **less stringent** than the value used as an Interim Cleanup Level. Because the new values are less stringent, it suggests that the Interim Groundwater Cleanup Levels for these compounds may provide for a level of public health protection that exceeds CERCLA program expectations.

Acetone
2-butanone (MEK)
4-methyl-2-pentanone (MIBK)
Isophorone
Silver and Zinc*

* The Interim GW Cleanup Level was based on a secondary MCL (aesthetic effects). Health or risk based concentrations are available for these compounds which can be used to evaluate the protectiveness of the secondary MCL if desired, and therefore these compounds have been included in this list as the health/risk based concentration is less stringent than the secondary MCL.

Lastly, the protectiveness review of the interim groundwater cleanup level for di-n-octyl phthalate could not be completed as no current dose-response values (Tier I, Tier II or Tier III) could be identified, and upon consultation with EPA's Superfund Technical Support Center, ORD could offer no advice at this time.

Finally, the most recent state regulation for assessment of groundwater quality applicable to the Site is listed below:

- *Rules and Regulations for Groundwater Quality*, State of Rhode Island and Providence Plantations Department of Environmental Management, Division of Groundwater and Individual Sewage Disposal Systems, Regulation 12-100-006, promulgated May 1992, last amended August 1996.

While the most recent Federal regulation for assessment of groundwater quality applicable to the Site is listed below:

- *Code of Federal Regulations, Title 40 – Protection of Environment Chapter I – Environmental Protection Agency, Part 141 – National Primary Drinking Water Regulations.*

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

NO. There have been no changes to the capped portion of the Site or at any of the adjacent properties that would call into question the protectiveness of the remedy. The regulations governing groundwater quality at the Site remain unchanged with the exceptions noted above (see response to Question B).

The land south of the capped portion of the Site is currently being used as a truck body assembly plant. This area is generally upgradient of the impacted groundwater and it encompasses the remaining approximately 19-acres of the Site. Since this area is upgradient of the impacted groundwater, the ongoing activities do not encroach upon the capped portion of the Site or the groundwater, since public water is provided to the area.

7.1 Technical Assessment Summary

According to the data reviewed for this five-year period and the Site inspections conducted during groundwater sampling events, the remedy is functioning as intended by the three RODs for the Site. There have been some changes in the regulatory statutes relevant to the interim groundwater cleanup levels, as described in the response to question B of Section 7.0. However none of these changes impact the short term protectiveness of the remedy as there is no use of the groundwater as a domestic water supply. Furthermore, institutional and engineering controls preclude the use of the groundwater as a such.

In addition, groundwater concentrations continue to decline, as indicated by plots of the overall trends for the four indicator compounds (TCE, PCE, vinyl chloride, and benzene) shown on the figures presented in Appendix C. However, recent concerns with the vinyl chloride statistical test results and the high detections of PCE, raises some concerns with regards to the future continuing declines in groundwater concentrations via natural attenuation.

Finally, the extent of the contaminant plume has also decreased in size over this five-year period. This trend is exhibited on the annual isoconcentration maps depicting maximum total volatile organics detected during the five-year period (Appendix D).

8.0 ISSUES

Table 2 summarizes the issues identified during the current five-year review period.

Table 2: Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
The OU III ROD requires a statistical trend analysis for only four indicator compounds rather than for all groundwater contaminants with ICLs that are currently being detected.	N	Y
On April 2007, the maximum concentration for PCE was extremely high (49 µg/L) from a split sample for well C4S. It is unclear whether this was in fact an accurate measurement or an error associated with field and/or analytical procedures.	N	Y
Recent guidance generally requires lines of evidence beyond the current statistical approach being used to support the performance of the natural attenuation remedy at this Site.	N	Y

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 3 addresses each of the issues identified above in Section 8.0 and includes recommendations for follow-up actions.

Table 3: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Limited analysis of data for all COCs	An evaluation of all detected groundwater contaminants with site-specific ICLs is needed.	PRP	EPA	Annually	N	Y
High PCE level	(a) Additional attention is needed to sampling and analytical QA/QC procedures for all groundwater monitoring wells, but in particular, well C4S.	PRP	EPA	Annually	N	Y
	(b) Perform field audits during the next several sampling rounds to determine if more frequent sampling is needed.	EPA (OEME)	EPA	October 2008- October 2009	N	Y
Natural attenuation Performance Criteria	The current statistical performance criteria should be reviewed in light of recent guidance on monitoring the performance of natural attenuation remedies.	PRP	EPA	Annually	N	Y

10.0 PROTECTIVENESS STATEMENT

OU I involved the construction of a water supply system to provide residents in the affected area with a permanent supply of safe drinking water. The water supply system has been in operation since September 1994. The remedy at OU I is protective of human health and the environment.

OU II involved the consolidation of contaminated soils to the cap area and construction of an impermeable barrier over the consolidated contaminated soils. The OU II remedy continues to minimize the continued release of contaminants to the groundwater and prevents public exposure to the contaminated soils. The remedy at OU II is protective of human health and the environment.

OU III relies on institutional controls to prevent the use of groundwater in the affected area, and monitored natural attenuation of contaminated groundwater (with a contingency for active pump and treat). It was originally projected that natural attenuation would require 24 to 28 years to achieve the target cleanup concentrations. As evidenced by the concentration trends of the four indicator compounds and the statistical analysis performed, natural attenuation is taking place and, at this time, there is no need for active pump and treat. The remedy at OU III is expected to be protective upon completion and in the interim, exposure pathways that could result in unacceptable risks are being prevented by institutional controls and the availability of a public water supply system in the area.

Overall, because the remedial actions at all OUs at the Western Sand and Gravel Site are protective, the Site is protective of human health and the environment.

11.0 NEXT REVIEW

The next five-year review for the Site will be required by September 2013, five years from the approval date of this review.

12.0 APPENDICES

Appendix A Site Map

Appendix B Tables Documenting Remedy Performance

Appendix C Figures Documenting Remedy Performance

Appendix D Annual Isoconcentration Maps

Appendix E Piezometric Data and Groundwater Flow Maps

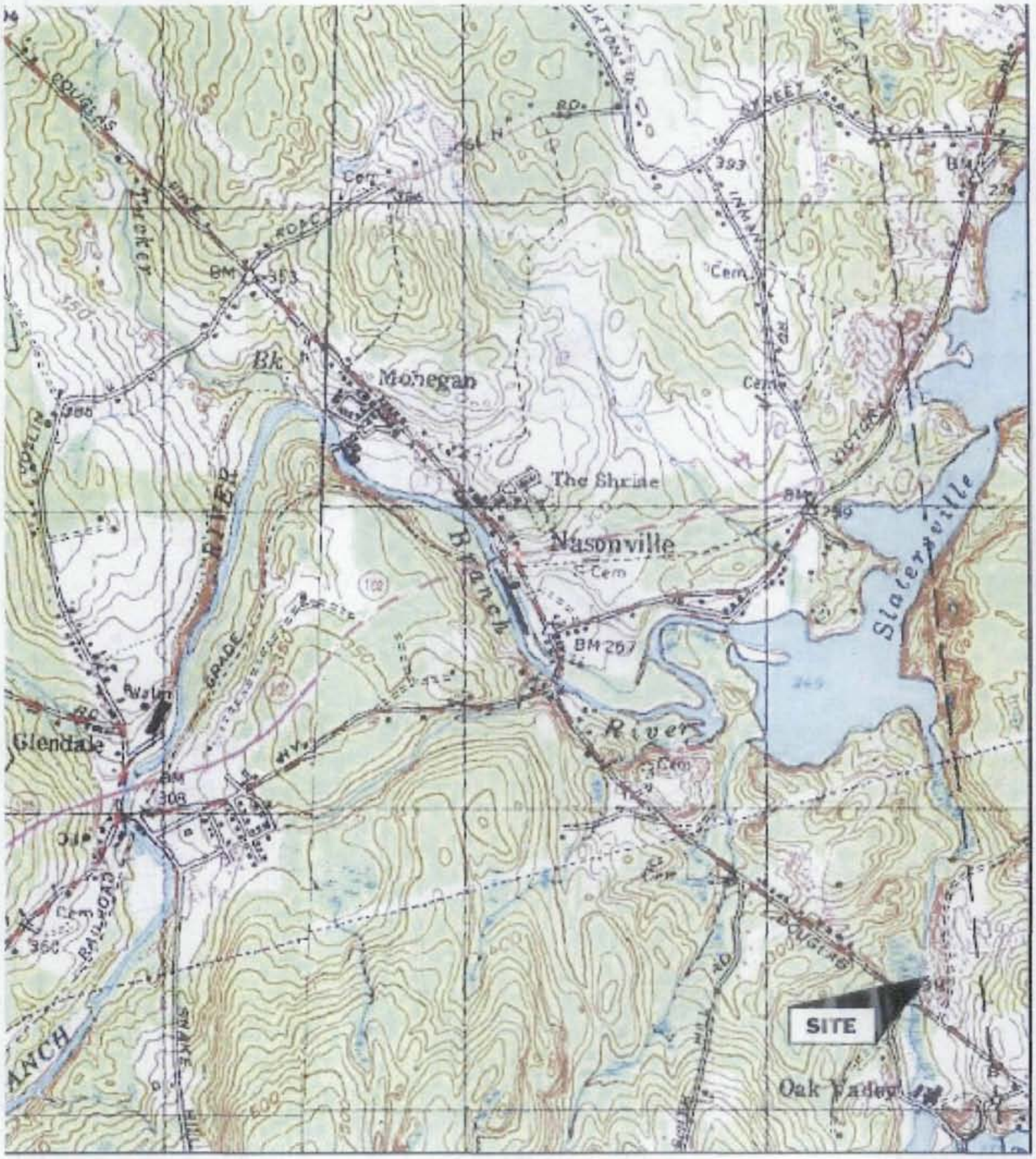
Appendix F October 2007 and March 2008 Site Inspection Reports

Appendix G Photographic Summary of Site Conditions

Appendix H COCs per ROD for OU III

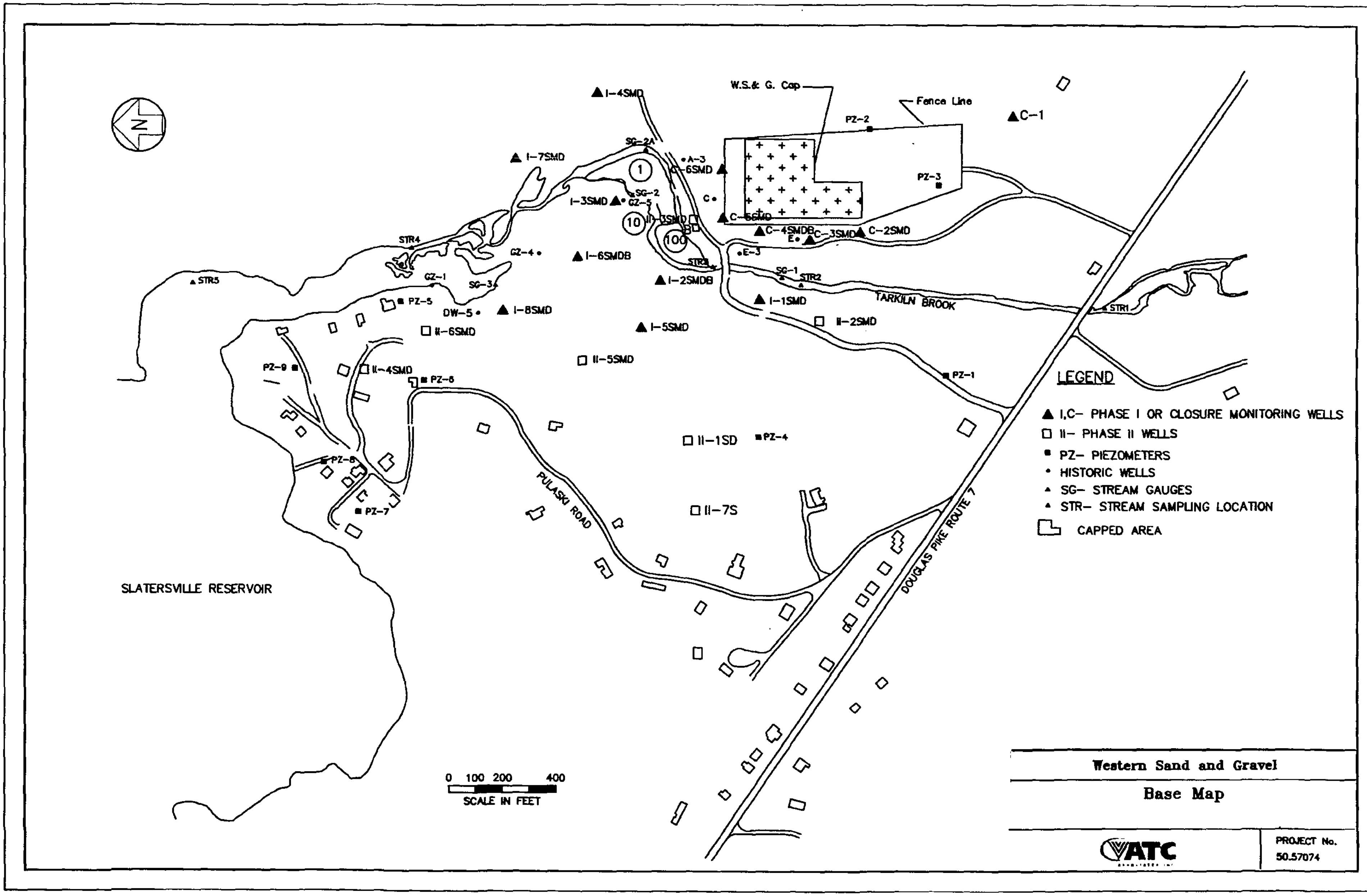
Appendix I Public Notice of 5YR Review

Appendix A
Site Maps



SITE VICINITY MAP

Woonsocket, Rhode Island USGS 7.5 Min. Quadrangle Map Courtesy of U.S. Geological Survey/Terra Server **SCALE:** 1" = 2 miles	ATC ASSOCIATES INC	Western Sand and Gravel Site Burrillville, Rhode Island


W.S.& G. Cap
Fence Line
PZ-2
C-1
I-4SMD
SG-2A
A-3
C-6SMD
I-7SMD
PZ-3
SG-2
I-3SMD
GZ-5
C
II-3SMD
C-5SMD
C-4SMDB
C-3SMD
C-2SMD
E
STR4
GZ-4
I-6SMDB
STR3
E-3
SG-1
STR2
STR5
GZ-1
SG-3
I-2SMDB
I-1SMD
TARKILN BROOK
STR1
PZ-5
DW-5
I-8SMD
II-6SMD
I-5SMD
II-2SMD
II-5SMD
PZ-9
II-4SMD
PZ-6
PZ-1
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
II-1SD
PZ-4
PZ-8
PULASKI ROAD
II-7S
PZ-7
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
0 100 200 400
SCALE IN FEET
Western Sand and Gravel
Base Map
ATC
PROJECT No.
50.57074

Appendix B
Tables Documenting Remedy Performance

TABLE 1-1

SUMMARY OF DETECTED VOLATILE CONCENTRATIONS IN GROUNDWATER (Mar 03 - Oct 07)

WESTERN SAND AND GRAVEL SITE

BURRILLVILLE, RHODE ISLAND

		Mar-03	Sep-03	Mar-04	Sep-04	Mar-05	Sep-05	Mar-06	Mar-06-SPLIT	Sep-06	Sep-06-SPLIT	Apr-07	Apr-07-SPLIT	Oct-07	Oct-07-LF	Oct-07-PDB
Location:																
C1D			X		X		X			X				X		
	Toluene	NA	0.68UJ	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Methylene Chloride	NA	R	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
C2S			X		X		X			X				X		
	Toluene	NA	0.72U	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
C2M			X		X		X			X				X		
	Toluene	NA	0.78U	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	0.9J	NA	NA
	Methylene Chloride	NA	R	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
C2D			X		X		X			X				X		
	Toluene	NA	0.62U	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
C3S			X		X		X			X				X		
	Toluene	NA	0.76U	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Methylene Chloride	NA	R	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
C3M			X		X		X			X				X		
	Toluene	NA	0.79U	NA	0.63J	NA	ND	NA	NA	0.6J	NA	NA	NA	0.4J	NA	NA
	Xylenes	NA	ND	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Methylene Chloride	NA	R	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
C3D			X		X		X			X				X		
	Toluene	NA	0.73U	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
C4S		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Benzene	ND	ND	ND	ND	ND	ND	ND	ND	0.6J	ND	0.8J	ND	2	ND	ND
	Toluene	ND	0.76U	0.71JB	0.60J	ND	ND	0.9J	16	ND	ND	4	0.4J	ND	ND	ND
	Chlorobenzene	ND	ND	ND	ND	ND	ND	12	18	ND	ND	0.6J	12	ND	ND	ND
	Ethylbenzene	ND	ND	ND	ND	ND	ND	1.0J	24	2	ND	3	1.0J	1	ND	ND
	Xylenes	ND	ND	ND	ND	ND	ND	4	54	5	ND	5	ND	8.8	ND	ND
	1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Vinyl Chloride	ND	ND	ND	ND	ND	ND	15	15	0.6J	ND	1	1	0.5J	ND	ND
	1,1-Dichloroethene	ND	ND	ND	ND	0.32J	ND	4	4	2	1	1	2	2	ND	ND
	Methylene Chloride	ND	R	ND	ND	1.5JB	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	trans-1,2-Dichloroether	ND	ND	ND	ND	0.43J	ND	1	2	1	ND	ND	1	ND	ND	ND
	1,1-Dichloroethane	1.6 J	7.8	13	0.86J	11	3	33	37	36	14	22	40	29	2	3
	cis-1,2-Dichloroethene	14 J	100DJ	120	1.4	70	16	180	200D	120	120	110	230D	49	13	21
	Chloroform	ND	ND	ND	ND	ND	ND	ND	0.5J	0.6J	ND	ND	ND	1	ND	ND
	1,1,1-Trichloroethane	1.4 J	12	15	4.6	16	4	51	66	58	17	41	52	84	2	2
	Trichloroethene	ND	2.6	5.0	ND	7.5	0.7J	7	9	5	5	7	11	5	ND	0.7J
	Tetrachloroethene	1.4 J	12	19	0.22J	18	3	14	21	21	22	29	49	5	2	3
C4M		X	X	X	X	X	X	X		X		X		X		
	Toluene	ND	0.74U	0.72JB	ND	1.1	ND	ND	NA	ND	NA	ND	NA	0.3J	NA	NA

TABLE 1-1

SUMMARY OF DETECTED VOLATILE CONCENTRATIONS IN GROUNDWATER (Mar 03 - Oct 07)
WESTERN SAND AND GRAVEL SITE
BURRILLVILLE, RHODE ISLAND

		Mar-03	Sep-03	Mar-04	Sep-04	Mar-05	Sep-05	Mar-06	Mar-06-SPLIT	Sep-06	Sep-06-SPLIT	Apr-07	Apr-07-SPLIT	Oct-07	Oct-07-LF	Oct-07-PDB
Location:																
	Xylenes	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	NA
	Methylene Chloride	ND	R	2.8B	ND	1.3JB	ND	ND	NA	ND	NA	ND	NA	ND	NA	NA
	1,1-Dichloroethane									0.5J	NA	ND	NA	ND	NA	NA
	cis-1,2-Dichloroethene									3	NA	ND	NA	ND	NA	NA
	Tetrachloroethene									0.7J	NA	ND	NA	ND	NA	NA
C4D		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Toluene	ND	0.88U	0.73JB	4.0	ND	ND	ND	27	ND	ND	ND	ND	ND	ND	ND
	Chlorobenzene	3.0 J	6.6	8.8	0.67J	1.4	1	0.5J	ND	0.9J	ND	0.8J	0.5J	ND	ND	ND
	Ethylbenzene	ND	ND	0.64J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.6J
	Methylene Chloride	ND	R	2.0JB	ND	2.6B	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	1,1-Dichloroethane	ND	ND	ND	ND	ND	0.7J	0.4J	ND	1	0.9J	0.9J	0.9J	ND	ND	ND
	cis-1,2-Dichloroethene							0.8J	ND	2	ND	ND	ND	ND	ND	ND
	Tetrachloroethene							ND	0.6J	0.6J	0.8J	0.6J	ND	ND	ND	ND
C5S		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Toluene	ND	0.70U	0.79JB	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Methylene Chloride	ND	R	2.5B	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	trans-1,2-Dichloroether	2.2J	ND	ND	0.91J	0.66J	1	ND	ND	ND	ND	ND	ND	0.6J	ND	ND
	1,1-Dichloroethene	1.1	ND	ND	1.0	0.71J	1	ND	ND	ND	ND	ND	ND	0.8J	0.6J	ND
	1,1-Dichloroethane	47J	4.4	6.2	27E	17	17	2	6	4	2	3	2	14	9	7
	cis-1,2-Dichloroethene	210J	31D	20	50E	91	74	8	28J	13	8	10	3	55	34	31
	Chloroethane	1.4UJ	ND	ND	1.4	ND	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Chloroform	4.9J	ND	ND	1.3	ND	0.4J	ND	ND	ND	ND	ND	ND	ND	ND	ND
	1,1,1-Trichloroethane	76J	19	23	48E	37	40	7	14	10	7	12	10	28	22	18
	Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Trichloroethene	6.1J	ND	0.58J	3.8	3.4	2	ND	0.9J	ND	0.5J	ND	ND	2	1	1
	Tetrachloroethene	4J	0.87J	0.96J	2.6	1.9	2	0.7J	1	0.7J	0.7J	0.8J	0.7J	1	0.9J	1
C5M		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Benzene	3.5	ND	1.3	ND	0.36J	2	ND	ND	2	3	ND	1	1	2	1
	Toluene	57	150D	55B	4.0	3.6	61	ND	3	1	ND	ND	ND	ND	ND	ND
	Chlorobenzene	27J	32DJ	9.0	2.3	1.6	16	ND	ND	14	22	4	10	9	10	ND
	Ethylbenzene	47	50D	15	2.6	0.88J	25	ND	ND	13	22	4	10	2	0.4J	ND
	Xylenes	68	98D	34	0.64J	2.5	36	ND	ND	9	14	0.9J	6	0.5J	1	ND
	1,4-Dichlorobenzene	1.4J	ND	ND	ND	ND	ND	ND	ND	ND	0.4J	ND	ND	ND	ND	ND
	1,2-Dichlorobenzene	1.8J	2.1J	ND	ND	ND	0.8J	ND	ND	1	2	0.6J	1	ND	ND	ND
	Vinyl Chloride	16J	3.7J	4.2	ND	ND	1	ND	ND	2	3	ND	ND	0.5J	0.8J	ND
	1,1-Dichloroethene	ND	0.22J	0.18J	ND	0.18J	1	ND	ND	0.7J	1	ND	ND	ND	ND	ND
	Methylene Chloride	ND	R	2.0JB	ND	1.9JB	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	1,1-Dichloroethane	13J	9.4	5.2	ND	1.1	6	ND	ND	6	10	2	4	3	4	ND
	cis-1,2-Dichloroethene	32J	56D	13	1.1	3.4	18	ND	ND	10	18	2	4	4	6	1
	Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 1-1

SUMMARY OF DETECTED VOLATILE CONCENTRATIONS IN GROUNDWATER (Mar 03 - Oct 07)
WESTERN SAND AND GRAVEL SITE
BURRILLVILLE, RHODE ISLAND

		Mar-03	Sep-03	Mar-04	Sep-04	Mar-05	Sep-05	Mar-06	Mar-06-SPLIT	Sep-06	Sep-06-SPLIT	Apr-07	Apr-07-SPLIT	Oct-07	Oct-07-LF	Oct-07-PDB
Location:																
	1,1,1-Trichloroethane	ND	0.69J	0.25J	ND	ND	0.5J	ND	ND	ND	ND	ND	ND	ND	ND	ND
	1,2-Dichloroethane	ND	0.75J	ND	ND	0.38J	0.7J	ND	ND	0.8J	1	ND	0.4J	ND	ND	ND
	Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5J	ND	ND	ND	ND	ND
	Tetrachloroethene	ND	0.30J	ND	ND	ND	0.4J	ND	ND	0.6J	ND	ND	ND	ND	ND	ND
C5D		X	X	X	X	X	X	X	X	X		X		X		
	Toluene	ND	0.80U	0.96JB	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	NA
	Methylene Chloride	ND	R	ND	ND	1.5JB	ND	ND	NA	ND	NA	ND	NA	ND	NA	NA
	1,2-Dichlorobenzene	ND	0.86J	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	NA
	cis-1,2-Dichloroethene									2	NA	ND	NA	ND	NA	NA
	Tetrachloroethene									0.8J	NA	ND	NA	ND	NA	NA
C6S		X	X	X	X	X	X	X		X		X		X		
	Toluene	ND	0.74UJ	0.74JB	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	NA
	Methylene Chloride	ND	R	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	NA
C6M		X	X	X	X	X	X	X		X		X		X		
	Toluene	ND	0.77UJ	0.62JB	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	NA
	Methylene Chloride	ND	R	ND	ND	1.2JB	ND	ND	NA	ND	NA	ND	NA	ND	NA	NA
C6D		X	X	X	X	X	X	X		X		X		X		
	Toluene	ND	0.78UJ	0.69JB	1.2	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	NA
	Methylene Chloride	ND	R	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	NA
I1D																
	Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
I2S			X		X		X			X		X		X		
	Toluene	NA	0.84U	NA	0.63J	NA	ND	NA	NA	ND	NA	ND	NA	ND	NA	NA
I2M			X		X		X			X				X		
	Chloroform	NA	0.76J	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Toluene	NA	0.84U	NA	0.63J	NA	ND	NA	NA	0.5J	NA	NA	NA	ND	NA	NA
I2D			X		X		X			X				X		
	Toluene	NA	0.77U	NA	0.54J	NA	ND	NA	NA	0.8J	NA	NA	NA	ND	NA	NA
I3S			X		X		X			X				X		
	Vinyl Chloride	NA	ND	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	trans-1,2-Dichloroether	NA	ND	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	cis-1,2-Dichloroethene	NA	ND	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Toluene		0.81U	NA	ND	NA	ND	NA	NA	0.7J	NA	NA	NA	ND	NA	NA
	1,1-Dichloroethene									2	NA	NA	NA	ND	NA	NA
I3M			X		X		X			X				X		

TABLE 1-1

SUMMARY OF DETECTED VOLATILE CONCENTRATIONS IN GROUNDWATER (Mar 03 - Oct 07)

WESTERN SAND AND GRAVEL SITE

BURRILLVILLE, RHODE ISLAND

Location:		Mar-03	Sep-03	Mar-04	Sep-04	Mar-05	Sep-05	Mar-06	Mar-06-SPLIT	Sep-06	Sep-06-SPLIT	Apr-07	Apr-07-SPLIT	Oct-07	Oct-07-LF	Oct-07-PDB
	Toluene	NA	0.78U	NA	ND	NA	ND	NA	NA	0.7J	NA	NA	NA	ND	NA	NA
I3D			X		X		X			X				X		
	Chlorobenzene	NA	ND	NA	ND	NA	0.9J	NA	NA	ND	NA	NA	NA	ND	NA	NA
	1,2-Dichlorobenzene	NA	ND	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	1,1-Dichloroethane	NA	ND	NA	1.2	NA	1	NA	NA	0.5J	NA	NA	NA	ND	NA	NA
	Methylene Chloride	NA	2.0R	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	cis-1,2-Dichloroethene	NA	0.86J	NA	1.7	NA	2	NA	NA	0.5J	NA	NA	NA	0.4J	NA	NA
	Chloroform	NA	1.1	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Trichloroethene	NA	0.55J	NA	2.4	NA	2	NA	NA	1	NA	NA	NA	0.7J	NA	NA
	Tetrachloroethene	NA	0.90U	NA	ND	NA	0.5J	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Toluene									0.7J	NA	NA	NA	0.4J	NA	NA
I4S			X		X		X			X				X		
	Toluene	NA	0.80U	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
I4M			X		X		X			X				X		
	Tetrachloroethene	NA	ND	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Toluene	NA	0.78U	NA	ND	NA	ND	NA	NA	3	NA	NA	NA	ND	NA	NA
I4D			X		X		X			X				X		
	Tetrachloroethene	NA	ND	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Toluene	NA	0.84U	NA	ND	NA	2	NA	NA	ND	NA	NA	NA	ND	NA	NA
	trans-1,2-Dichloroethene									1	NA	NA	NA	ND	NA	NA
I6S			X		X		X			X				X		
	Methylene Chloride	NA	R	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Chloroform	NA	ND	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Toluene	NA	0.70U	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
I6M			X		X		X			X				X		
	Toluene	NA	0.71U	NA	0.7J	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
I6D			X		X		X			X				X		
	Toluene	NA	0.75U	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
I7S			X		X		X			X				X		
	Toluene	NA	0.70U	NA	0.58J	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
I7M			X		X		X			X				X		
	Toluene	NA	0.79U	NA	0.62J	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
I7D			X		X		X			X				X		
	Toluene	NA	0.84U	NA	0.59J	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA
	Tetrachloroethene	NA	ND	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA

TABLE 1-1

SUMMARY OF DETECTED VOLATILE CONCENTRATIONS IN GROUNDWATER (Mar 03 - Oct 07)
WESTERN SAND AND GRAVEL SITE
BURRILLVILLE, RHODE ISLAND

Location:		Mar-03	Sep-03	Mar-04	Sep-04	Mar-05	Sep-05	Mar-06	Mar-06-SPLIT	Sep-06	Sep-06-SPLIT	Apr-07	Apr-07-SPLIT	Oct-07	Oct-07-LF	Oct-07-PDB
	trans-1,2-Dichloroethene									1	NA	NA	NA	ND	NA	NA
II2M							X							X		
	Methylene Chloride	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA	NA
II2D							X							X		
	Methylene Chloride	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA	NA
II3S		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Benzene	ND	ND	ND	ND	2	ND	ND	3	3	4	1	ND	ND	ND	ND
	Toluene	ND	0.81U	0.75JB	ND	1.6	ND	0.8J	96	ND	0.6J	20	0.6J	ND	ND	ND
	Chlorobenzene	ND	ND	ND	ND	46	ND	0.4J	13	2	2	2	ND	ND	ND	ND
	Ethylbenzene	ND	ND	ND	ND	1.6	ND	ND	55	3	3	17	0.3J	ND	ND	ND
	Xylenes	ND	ND	ND	ND	11	ND	ND	100	9	28	26	ND	ND	ND	ND
	1,2-Dichlorbenzene	ND	ND	ND	ND	ND	ND	ND	0.4J	ND	ND	ND	ND	ND	ND	ND
	Vinyl Chloride	ND	ND	ND	ND	31	0.6J	1	12	5	4	10	1	3	2	1
	1,1-Dichloroethene	ND	ND	ND	ND	2.1	ND	0.8J	1	6	6	1	1	ND	ND	ND
	Methylene Chloride	ND	R	ND	ND	57B	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	trans-1,2-Dichloroether	ND	ND	ND	ND	1.4	ND	2	9	4	1	2	2	ND	ND	ND
	1,1-Dichloroethane	12J	12	16	0.46J	37	7	44	64	57	62	57	58	8	7	10
	cis-1,2-Dichloroethene	30	140D	98	2.8	110	44	210	380D	190	190	240D	270D	44	46	60
	Chloroform	ND	ND	ND	ND	3.2	ND	1	2	0.9J	0.7J	2	2	ND	ND	ND
	1,1,1-Trichloroethane	17J	39D	20	0.30J	46	8	60	81	120	120	66	64	6	5	7
	Trichloroethene	2.6J	4.3J	5.0	ND	4.1	2	6	6	5	5	4	4	1	2	2
	Tetrachloroethene	7.4J	14	17	0.82J	4.5	8	3	4	33	31	7	5	6	6	9
	Chloroethane											1J	1J	ND	ND	ND
II3M		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Benzene	ND	ND	ND	ND	0.21J	ND	1	0.8J	ND	ND	ND	ND	0.9J	ND	ND
	Toluene	ND	0.84U	0.84JB	ND	0.99J	ND	53	34	ND	ND	ND	ND	ND	ND	ND
	Chlorobenzene	6.3J	3.4J	6.6	ND	5.1	3	10	7	9	40	3	7	ND	ND	ND
	Ethylbenzene	ND	ND	ND	ND	0.20J	ND	10	7	ND	0.5J	ND	0.4J	ND	ND	ND
	Xylenes	ND	ND	ND	ND	ND	ND	18	13	ND	ND	ND	ND	ND	ND	ND
	1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	0.5J	0.4J	ND	ND	ND	ND	ND	ND	ND
	Vinyl Chloride	ND	ND	ND	ND	ND	ND	2	1	2	8	ND	1	ND	ND	ND
	Methylene Chloride	ND	R	ND	ND	2.6B	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
II3M	1,1-Dichloroethane	ND	ND	0.55J	1.1	4.4	2	6	4	3	8	ND	4	1	0.7J	0.9J
(cont'd)	1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	cis-1,2-Dichloroethene							2	1	2	0.6	ND	ND	0.4J	ND	ND
	Trichloroethene									ND	1	0.4J	ND	ND	ND	ND
	Tetrachloroethene									1	3	ND	ND	ND	ND	ND
	1,1,1-Trichloroethane											ND	0.7J	ND	ND	ND
II3D		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Toluene	ND	0.75U	0.83JB	ND	1.1	ND	ND	ND	ND	ND	ND	ND	0.3J	ND	ND
	Chlorobenzene	ND	2.0J	2.1	ND	0.91J	3	0.4J	ND	ND	ND	0.3J	0.9J	ND	ND	ND
	Methylene Chloride	ND	R	ND	ND	1.45B	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 1-1

SUMMARY OF DETECTED VOLATILE CONCENTRATIONS IN GROUNDWATER (Mar 03 - Oct 07)

WESTERN SAND AND GRAVEL SITE

BURRILLVILLE, RHODE ISLAND

		Mar-03	Sep-03	Mar-04	Sep-04	Mar-05	Sep-05	Mar-06	Mar-06-SPLIT	Sep-06	Sep-06-SPLIT	Apr-07	Apr-07-SPLIT	Oct-07	Oct-07-LF	Oct-07-PDB
Location:																
	1,1-Dichloroethane	ND	0.85J	ND	1.0	0.46J	1	ND	ND	0.5J	0.5J	ND	0.5J	0.6J	0.7J	0.7J
	Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
II5S	Methylene Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
II5M	Methylene Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
II6D	Methylene Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
II7S	Chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
micrograms per liter (u g/L)
J = estimated value.
B = Analyte was detected in the laboratory method blank analyzed concurrently with the sample.
U = adjusted quantitation due to blank contamination.
UJ = estimated quantitation limit.
D = value obtained from a secondary dilution.
ND = not detected above quantitation limit.
NA = not analyzed because well was not sampled.
X = well was sampled during sampling event.
R = rejected value.

TABLE 1-2

SUMMARY OF DETECTED SEMIVOLATILE CONCENTRATIONS IN GROUNDWATER

WESTERN SAND AND GRAVEL SITE

BURRILLVILLE, RHODE ISLAND

		Sep-03	Sep-04	Sep-05	Oct-07
Location:					
I2S					
	Diethylphthalate	ND	ND	ND	ND
	Di-n-Butylphthalate	0.3U	ND	ND	ND
	bis(2-ethylhexyl)phthalate	2U	ND	ND	ND
I2M					
	Diethylphthalate	0.3U	ND	ND	ND
	Di-n-Butylphthalate	0.8U	ND	ND	ND
	bis(2-ethylhexyl)phthalate	2U	ND	ND	ND
I2D					
	Diethylphthalate	ND	ND	ND	ND
	Di-n-Butylphthalate	ND	ND	ND	ND
	bis(2-ethylhexyl)phthalate	2U	ND	ND	ND
I3S					
	Diethylphthalate	0.2U	ND	ND	ND
	Di-n-butylphthalate	0.9U	ND	ND	ND
	butylbenzylphthalate	0.3U	ND	ND	ND
	bis(2-ethylhexyl)phthalate	10U	ND	ND	ND
I3M					
	Diethylphthalate	0.8U	ND	ND	ND
	bis(2-ethylhexyl)phthalate	1.0U	ND	ND	ND
I3D					
	Diethylphthalate	0.6U	ND	ND	ND
	Di-n-butylphthalate	1J	ND	ND	ND
	bis(2-ethylhexyl)phthalate	8U	ND	ND	ND
II3S					
	Di-n-butylphthalate	0.5U	ND	ND	ND
	bis(2-ethylhexyl)phthalate	ND	ND	ND	ND
	Caproloactam				33
II3M					
	bis(2-ethylhexyl)phthalate	ND	ND	ND	ND
	Isophorone	ND	ND	ND	ND
	Caproloactam				6300
II3D					
	bis(2-ethylhexyl)phthalate	ND	ND	ND	ND
	Diethylphthalate	ND	ND	ND	ND
	Caproloactam				7400

TABLE 1-2

SUMMARY OF DETECTED SEMIVOLATILE CONCENTRATIONS IN GROUNDWATER

WESTERN SAND AND GRAVEL SITE

BURRILLVILLE, RHODE ISLAND

		Sep-03	Sep-04	Sep-05	Oct-07
Location:					
C2S					
	bis(2-ethylhexyl)phthalate	4U	ND	ND	ND
C2M					
	Diethylphthalate	ND	ND	ND	ND
	Di-n-butylphthalate	0.5U	ND	ND	ND
	bis(2-ethylhexyl)phthalate	2U	ND	11	ND
C2D					
	di-n-butylphthalate	0.4U	ND	ND	ND
	bis(2-ethylhexyl)phthalate	0.4U	ND	ND	ND
C3S					
	di-n-butylphthalate	0.5U	ND	ND	ND
	bis(2-ethylhexyl)phthalate	4U	ND	ND	ND
C3M					
	Diethylphthalate	0.3U	ND	ND	ND
	Di-n-butylphthalate	ND	ND	ND	ND
	bis(2-ethylhexyl)phthalate	3J	ND	ND	ND
C3D					
	Di-n-butylphthalate	ND	ND	ND	ND
	bis(2-ethylhexyl)phthalate	ND	ND	ND	ND
C4S					
	bis(2-ethylhexyl)phthalate	0.9U	ND	ND	ND
	Di-n-butylphthalate	0.9U	ND	ND	ND
	Caproloactam				35
C4M					
	bis(2-ethylhexyl)phthalate	2U	ND	ND	ND
C4D					
	Di-n-butylphthalate	0.6U	ND	ND	ND
	bis(2-ethylhexyl)phthalate	0.4U	ND	ND	ND
	Caproloactam				3800
C5S					
	bis(2-ethylhexyl)phthalate	6U	ND	ND	ND

TABLE 1-2

SUMMARY OF DETECTED SEMIVOLATILE CONCENTRATIONS IN GROUNDWATER

WESTERN SAND AND GRAVEL SITE
BURRILLVILLE, RHODE ISLAND

		Sep-03	Sep-04	Sep-05	Oct-07
Location:					
C5M					
	Phenol	26	ND	11	ND
	1,4-Dichlorobenzene	ND	ND	ND	ND
	1,2-Dichlorobenzene	ND	ND	ND	ND
	2-Methylphenol	ND	ND	ND	ND
	Acetophenone	ND	ND	ND	ND
	4-Methylphenol	38	ND	19	ND
	Isophorone	2J	ND	ND	ND
	2,4-Dimethylphenol	5J	ND	ND	ND
	2,4-Dichlorophenol	ND	ND	ND	ND
	Naphthalene	0.8J	ND	ND	ND
	Caproloactam	ND	ND	ND	3800
	4-Chloro-3-Methylphenol	1J	ND	ND	ND
	2-Methylnaphthalene	0.6J	ND	ND	ND
	Diethylphthalate	ND	ND	ND	ND
	bis(2-ethylhexyl)phthalate	1U	ND	ND	ND
	Di-n-butylphthalate	0.4U	ND	ND	ND
C5D					
	bis(2-ethylhexyl)phthalate	2U	ND	ND	ND
C6S					
	bis(2-ethylhexyl)phthalate	ND	ND	ND	ND
C6M					
	Di-n-butylphthalate	0.9U	ND	ND	ND
	bis(2-ethylhexyl)phthalate	1U	ND	ND	ND
C6D					
	Di-n-butylphthalate	0.6U	ND	ND	ND
	butylbenzylphthalate	0.4U	ND	ND	ND
	bis(2-ethylhexyl)phthalate	3U	ND	ND	ND

Notes:
For duplicate samples, the highest concentration is given.
Units - micrograms per liter (ug/L)
ND - Not detected
Semivolatiles were not analyzed in 1998, 2000, 2002 and 2006.
1 (10U) - estimated value detected below detection limit (10 ug/L).

TABLE 1-3

SUMMARY OF DETECTED METALS IN GROUNDWATER
WESTERN SAND AND GRAVEL SITE
BURRILLVILLE, RHODE ISLAND

SEPTEMBER 2003

	I3S	I3M	I3D	I-2S	I-2M	I-22M Dup	I-2D	C2S	C2M	C2D	C3S	C3M	C3D	C4S	C44S Dup	C4M	C4D	C6S	C6M	C6D	113S	113M	II3D	C5S	C5M	C5D
Aluminum	0.280 U	505	109 U	1340	110 U	140 U	134 U	129 U	134 U	194 U	74.6 U	86.1 U	1810	102 U	114 U	110 U	52.7 U	262 U	35.6 U	–	47.2 U	78.7 U	30.3 U	67 6 U	439	34.2 U
Barium	11.1	15 2	7.4	23.0	23.5	23.8	18 6	35.2	39 1	37.5	36.6	35 3	74.0	34 7	35 3	35.8	52.2	32 1	3.6 U	4.6 U	4.6 U	20.9	4.0 U	50.6	39.5	4.6 U
Cobalt	1.2 U	–	1 4 U	–	–	–	–	0.92 U	–	–	–	–	–	–	–	–	1.1 U	–	–	–	–	1.5 U	0.63 U	–	6.7 U	–
Copper	–	9.2 U	6 0 U	7 6 U	–	–	–	–	2 0 U	–	–	–	7.7 U	–	–	–	–	–	–	–	–	–	–	–	1.3 U	1.4 U
Lead	–	2 4 U	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nickel	1.7 U	1.7 U	1.1 U	1.6 U	–	–	–	1.2 U	–	4.6 U	–	–	–	1.9 U	1 8 U	–	3.0 U	–	–	–	1.1 U	9.1 U	1 6 U	12.8 U	3.1 U	–
Silver	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Zinc	–	3.2 U	9.4 U	–	–	–	7.0 U	9 9 U	9.3 U	2 2 U	7.5 U	17 1 U	8.3 U	6.6 U	7 2 U	2.2 U	12.9 U	3 8 U	2.2 U	3 2 U	3.2 U	6.7 U	2.4 U	0.64 U	9.4 U	11.4 U

SEPTEMBER 2004

	I3S	I3M	I3D	I-2S	I-2M	I-2D	C2S	C2M	C2D	C3S	C3M	C3D	C4S	C4M	C4D	C6S	C66S *Dup*	C6M	C6D	113S	113S *Dup*	113M	II3D	C5S	C5M	C5D
Aluminum	390	36.2 J	18.9 J	759	18.30 U	99.4 J	1040	18.30 U	159 J	100 J	55.6 J	225 J	258 J	56.2 J	105 J	3100	1730	50.7 J	49.5 J	1260	7490	53 1 J	48.9 J	1900	774	36 2 J
Barium	18.2	14.5	10.4	26.3	32 5	22.9	46.4	40.2	39 0	35.2	33.3	40.9	48 8	36 3	39.2	55.6	87.3	7.1	9.0	64.1	98.6	27.8	30 3	80.8	11.7	9.4
Cobalt	6.5 J	0.64 U	6.7 J	0.64 U	0.64 U	4.5 J	1.5 J	0.64 U	4.36 U	4.36 U	4.36 U	4.36 U	4 36 U	4 36 U	4.36 U	4.36 U	4.36 U	4.36 U	4.36 U	4.36 U	4.36 U	4.36 U	4.36 U	4.36 U	4 36 U	4.36 U
Copper	2.7 J	6.8 J	16.6 J	1.3 J	2 4 J	10.7 J	14.1 J	3.4 J	12.4 J	1.91 U	1.91 U	4.5 J	4.5 J	1.91 U	24.5 J	1.91 U	1 91 U	1.91 U	4.1 J	16.2 J	21.5 J	1.91 U	1.91 U	1.91 U	1 91 U	9.6 J
Lead	1 70 U	1.8 J	1 70 U	1.9 J	1.71 U	3.0 J	1.70 U	1.70 U	2.1 J	1.70 U	2.3 J	1.70 U	1.70 U	1.70 U	1.70 U	3.1 J	1.70 U	1.70 U	1.70 U	3.8 J	3.6 J	1.70 U	1.70 U	3.8 J	1.70 U	1.70 U
Nickel	4.0 J	1.7 J	2 0 J	1.1 J	1.1 J	1.9 J	1.7 J	1.1 J	11.0 J	10.80 U	10.80 U	10.8 J	10.80 U	10.80 U	11.0 J	14 4 J	22 1 J	10.80 U	10 80 U	10.80 U	10.80 U	16.5 J	15.2 J	17.2 J	14.1 J	11.0 J
Silver	1.1 J	0.70 U	0.70 U	0.70 U	0.70 U	0 70 U	0.70 U	0.70 U	2.84 U	4.5 J	4.0 J	4.2 J	4.0 J	2.84 U	2.84 U	3.4 J	4.1 J	3.0 J	3 0 J	2.84 U	2.84 U	2 84 U	2.84 U	3.8 J	3.6 J	2.84 U
Zinc	26 0	22.6 J	22.7 J	5.6 J	19.7 J	31.2	11.4 J	8.8 J	26 7	13.9 J	8.6 J	15.0 J	23.6 J	18.7 J	34.0	19.2 J	3.8 J	11.4 J	14.5 J	13 5 J	46.8	15.1 J	19.3 J	3.8 J	19.9 J	12 3 J

SEPTEMBER 2005

	I3S	I3M	I3D	I-2S	I-2M	I-2D	C2S	C2M	C2D	C3S	C3M	C3D	C4S	C4M	C4D	C6S	C66S Dup	C6M	C6D	113S	113S Dup	113M	II3D	C5S	C5M	C5D
Aluminum	0 353	0 0345 J	ND	0 901	0.0206 J	0.024 J	3.13	0.0234 J	0.181 J	0.731	0.0562 J	0.153 J	3.58	ND	0 0435 J	9.5	0.0547 J	0 0332 J	ND	0.929	3 4	ND	ND	1.51	0.188 J	0 0246 J
Barium	0.0136	0.0132	0.0153	0.022	0.0343	0 0202	0.0792	0.0442	0.0526	0.0769	0.0387	0.0337	0.0918	0.036	0.0328	0.083	0 0073	0.0052	0.0063	0.112	0.139	0.0194	0.0054	0.059	0.0376	0.0069
Cobalt	0.0024 J	ND	ND	ND	ND	ND	0.004 J	ND	ND	ND	ND	ND	0.0023 J	ND	ND	0.0018 J	ND	ND	ND	0 0063 J	0.0074 J	0.0023 J	ND	ND	0.0079 J	ND
Copper	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0179 J	ND	ND	ND	ND	ND	ND	ND	0.018 J	ND	ND	ND	ND	ND
Lead	0.002 J	ND	ND	ND	0.0017 J	0.002 J	0.0026 J	ND	ND	ND	ND	ND	0 0036 J	0.002 J	0.0023 J	ND	ND	ND	0.0022 J	0.0024 J	0.0064	0.0018 J	ND	ND	0.0022 J	ND
Nickel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0148 J	0 0125 J	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	0.0034 J	0.0091 J	0.0071 J	0.0025 J	0 0033 J	0.0165 J	0.0118 J	0.0078 J	0.0204 J	0.0044 J	0.0067 J	0.0242 J	0.0258	0.0074 J	0.024 J	0.0238 J	0.0222 J	0.0083 J	0.0131 J	0.0161 J	0.0271	0.0211 J	0.0048 J	0.003 J	0 0316	0.0149 J

OCTOBER 2007

	I3S	I3M	I3D	I2S	I2M	I2D	C2S	C2M	C2D	C3S	C3M	C3D	C4S	C4M	C4D	C5S	C5M	C5D	C5D Dup	C6S	C6M	C6D	II3S	II3S Dup	II3M	II3D
Aluminum	0.446	0.0903 J	0.0627 J	1.65	0.0455 J	0.0534 J	2 06	0.194 J	0.161 J	0 510	0.0510 J	0.379	1.09	0.0557 J	0 0443 J	1.55	0.417	0.0593 J	0.0810 J	3.50	0.0552 J	0.0753 J	7.84	5.65	ND	0 0348 J
Barium	0.0119	0 0128	0.0115	0.0234	0.0518	0.0176	0.0631	0.0366	0.0412	0.0449	0.0186	0.0306	0.0565	0.0274	0.0354	0 0543	0.0452	0.0066	0 0066	0.123	0.0049 J	0 0060	0.119	0.110	0.0223	0.0157
Cobalt	0 0112 J	0.00027 J	0.0018 J	0.00082 J	0 051 J	0 00060 J	0.0043 J	ND	0.00084 J	0.00043 J	ND	0.0015 J	0.0033 J	ND	0 00096 J	0.00028 J	0.0113 J	0.00027 J	0.00034 J	0 0094 J	ND	0 00033 J	0.0084 J	0.0071 J	0.0011 J	0.0018 J
Copper	0.00096 J	0.0052 J	0.0060 J	0.0021 J	0 0012 J	0.0041 J	0.0044 J	0.0045 J	0 0040 J	0.0025 J	0.0019 J	0.0036 J	0.0098 J	0.0020 J	0.0123 J	0.0011 J	0.0082 J	0.0024 J	0.0014 J	0.0194 J	0.0019 J	0.0010 J	0.0209 J	0.0162 J	0.00083 J	0.0036 J
Lead	0 0019 J	0.0041 J	0.0015 J	0 0022 J	ND	0.0011 J	0.0039 J	0.0021 J	0 0024 J	0.0021 J	0.0019 J	0.0015 J	0.0038 J	0.0014 J	0.0026 J	0.0023 J	0.0018 J	0 0018 J	ND	0 0097	0.0020 J	0.0020 J	0.0104	0.0086	0.0017 J	0.0029 J
Nickel	0 0011 J	0.0030 J	0.0017 J	0.0012 J	0.0016 J	0.0023 J	0.0023 J	0.0018 J	0.0018 J	0 00073 J	0.0010 J	0.0020 J	0 0078 J	0.0013 J	0.0038 J	0.0074 J	0.0057 J	0 0017 J	0.0016 J	0.0172 J	0.0015 J	0.00081 J	0.0124 J	0.0099 J	0.0013 J	0.0024 J
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00051 J	ND	ND	ND	ND	ND	ND	0.00059 J	ND	0.00051 J
Zinc	0.0072 J	0 0167 J	0.0209 J	0.0090 J	0.0090 J	0.0156 J	0 0162 J	0.0140 J	0.0195 J	0.0106 J	0.0108 J	0.0174 J	0.0313 J	0 0118 J	0.0293 J	0 0060 J	0 265 J	0.0099 J	0.0101 J	0.0667 J	0.0100 J	0.0082 J	0 0606 J	0.0439 J	0.0106 J	0 0297 J

TABLE 1-3

SUMMARY OF DETECTED METALS IN GROUNDWATER
WESTERN SAND AND GRAVEL SITE
BURRILLVILLE, RHODE ISLAND

J - Denotes an estimated value less than the contract required quantitation limit (CRQL) or exceeding QC criteria.
U - Questionable qualitative value due to blank contamination. Reported results have been changed to reflect an adjusted quanitation limit
All concentrations in units of milligrams per liter (mg/L).

Appendix C
Figures Documenting Remedy Performance

WILCOXON SIGNED RANK TEST FOR BENZENE

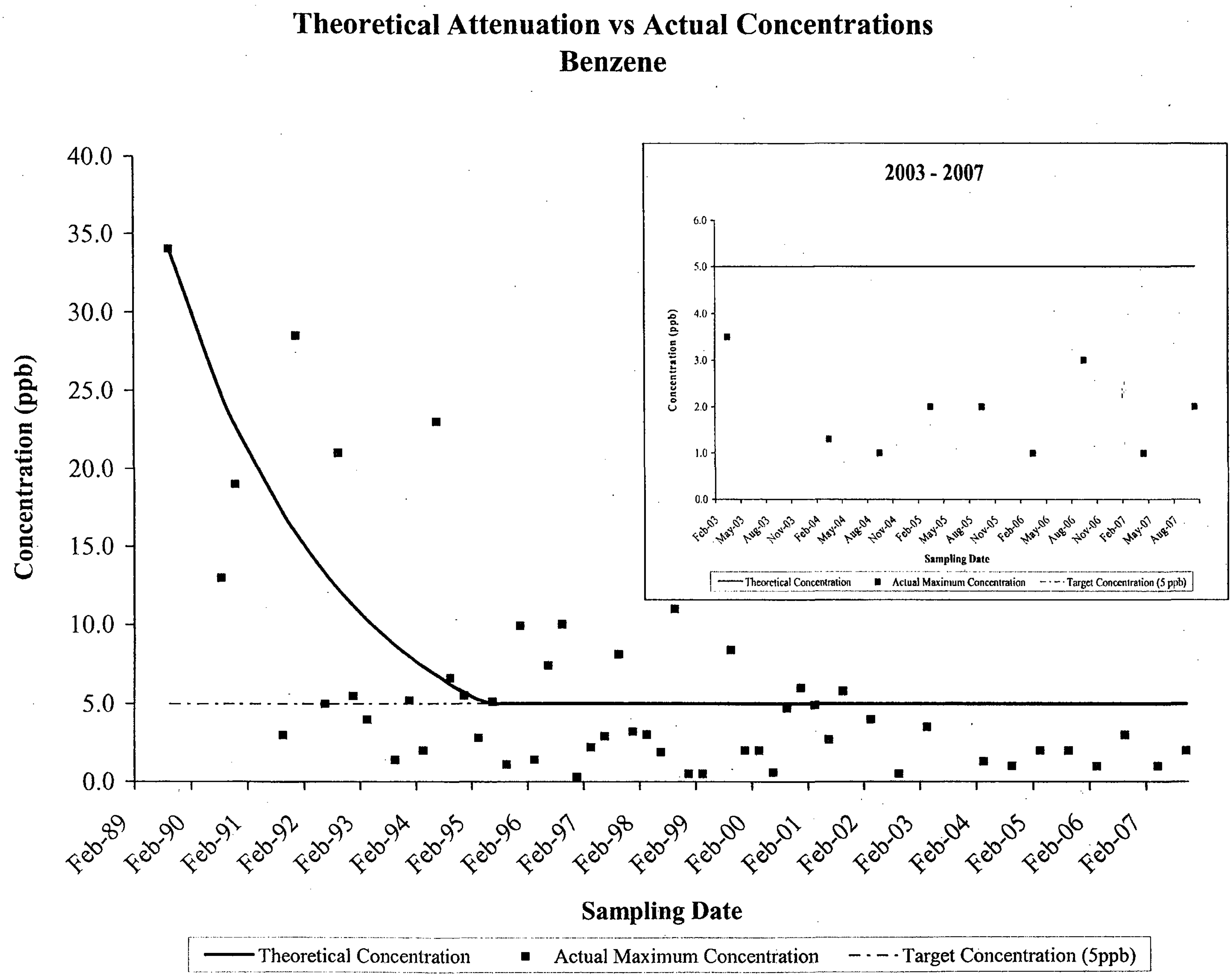
October 2007 Sampling Event
Target Concentration - 5.0 ppb

Sampling Month	x	Theoretical Concentration (ppb)	Actual Maximum Concentration (ppb)	Y_i (Difference of Theoretical and Actual)	Absolute Value Y_i	R_i (Ranking)	W_i (Value Weight)	$(R_i)(W_i)$	n (No. of Events)
September-89	-18	34.0	34.0	0 0	0	1	0	0	1
August-90	-7	24.8	13.0	-11.8	11.8	51	0	0	2
November-90	-4	22 8	19.0	-3 8	3 8	30	0	0	3
September-91	6	17.2	3.0	-14.2	14.2	53	0	0	4
December-91	9	15.8	28.5	12.7	12 7	52	1	52	5
June-92	15	13.3	5 0	-8.3	8.3	47	0	0	6
September-92	18	12.2	21.0	8 8	8.8	48	1	48	7
December-92	21	11.2	5.5	-5.7	5.7	43	0	0	8
March-93	24	10.3	4.0	-6.3	6.3	45	0	0	9
June-93	27	9.5	[illegible]	-9.5	9.5	49	0	0	10
September-93	30	8.7	1.4	-7.3	7.3	46	0	0	11
December-93	33	8.0	5.2	-2 8	2.8	19	0	0	12
March-94	36	7.3	2 0	-5.3	5 3	42	0	0	13
June-94	39	6.7	23.0	16.3	16 3	54	1	54	14
September-94	42	6.2	6.6	0.4	0.4	6	1	6	15
December-94	45	5 7	5 5	-0.2	0.2	4	0	0	16
March-95	48	5.2	2 8	-2.4	2.4	17	0	0	17
June-95	51	5.0	5.1	0.1	0.1	2	1	2	18
September-95	54	5 0	1.1	-3.9	3.9	31	0	0	19
December-95	57	5.0	9.9	4 9	4.9	40	1	40	20
March-96	60	5.0	1 4	-3.6	3.6	28	0	0	21
June-96	63	5.0	7.4	2.4	2.4	16	1	16	22
September-96	66	5.0	10.0	5 0	5.0	41	1	41	23
December-96	69	5.0	0.3	-4.7	4.7	39	0	0	24
March-97	72	5.0	2.2	-2.8	2.8	18	0	0	25
June-97	75	5.0	2 9	-2 1	2.1	14	0	0	26
September-97	78	5.0	8.1	3.1	3.1	25	1	25	27
December-97	81	5 0	3.2	-1 8	1.8	11	0	0	28
March-98	84	5.0	3.0	-2 0	2.0	12	0	0	29
June-98	87	5.0	1.9	-3.1	3.1	26	0	0	30
September-98	90	5.0	11.0	6.0	6.0	44	1	44	31
December-98	93	5.0	0 5	-4 5	4.5	36	0	0	32
March-99	96	5.0	0 5	-4.5	4.5	36	0	0	33
June-99	99	5.0	16.0	11.0	11.0	50	1	50	34
September-99	102	5.0	8.4	3.4	3.4	27	1	27	35
December-99	105	5.0	2 0	-3 0	3 0	20	0	0	36
March-00	108	5.0	2.0	-3.0	3.0	20	0	0	37
June-00	111	5 0	0.6	-4 4	4.4	35	0	0	38
September-00	114	5 0	4.7	-0.3	0.3	5	0	0	39
December-00	117	5.0	6.0	1.0	1.0	8	1	8	40
March-01	120	5.0	4.9	-0.1	0.1	2	0	0	41
June-01	123	5.0	2 7	-2.3	2.3	15	0	0	42
September-01	126	5.0	5 8	0 8	0 8	7	1	7	43
March-02	132	5.0	4 0	-1.0	1 0	8	0	0	44
September-02	138	5.0	0.5	-4.5	4 5	36	0	0	45
March-03	144	5 0	3 5	-1.5	1 5	10	0	0	46
March-04	156	5.0	1.3	-3.7	3 7	29	0	0	47
September-04	162	5.0	1 0	-4.0	4 0	32	0	0	48
March-05	168	5.0	2.0	-3.0	3 0	20	0	0	49
September-05	174	5.0	2 0	-3.0	3.0	20	0	0	50
March-06	180	5.0	1	-4 0	4 0	32	0	0	51
September-06	186	5.0	3	-2.0	2.0	12	0	0	52
April-07	193	5 0	1	-4 0	4 0	32	0	0	53
October-07	200	5.0	2	-3 0	3.0	20	0	0	53

Signed Rank Test Passed Since **T^+ =** **$Sum(R_i)(W_i)$ =** 420

$T^+ < t(\alpha,n)$ **t(0.05, 53) =** 426

mean	7.48	6.08	mean is lower
sdevp	5.65	7.16	Outlier - Jun-93 (59.0)
cv	0.76	1.18	
ttest	3.56E-02		t-test passed (0.0356 vs. 0.05)
correl	0.677		positive correlation



Theoretical Attenuation vs Actual Concentrations
Benzene
Concentration (ppb)
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Feb-89
Feb-90
Feb-91
Feb-92
Feb-93
Feb-94
Feb-95
Feb-96
Feb-97
Feb-98
Feb-99
Feb-00
Feb-01
Feb-02
Feb-03
Feb-04
Feb-05
Feb-06
Feb-07
Sampling Date
Theoretical Concentration
Actual Maximum Concentration
Target Concentration (5ppb)
2003 - 2007
Concentration (ppb)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Feb-03
May-03
Aug-03
Nov-03
Feb-04
May-04
Aug-04
Nov-04
Feb-05
May-05
Aug-05
Nov-05
Feb-06
May-06
Aug-06
Nov-06
Feb-07
May-07
Aug-07
Sampling Date
Theoretical Concentration
Actual Maximum Concentration
Target Concentration (5 ppb)

WILCOXON SIGNED RANK TEST FOR TETRACHLOROETHENE (PCE)

October 2007 Sampling Event

Target Concentration - 5.0 ppb

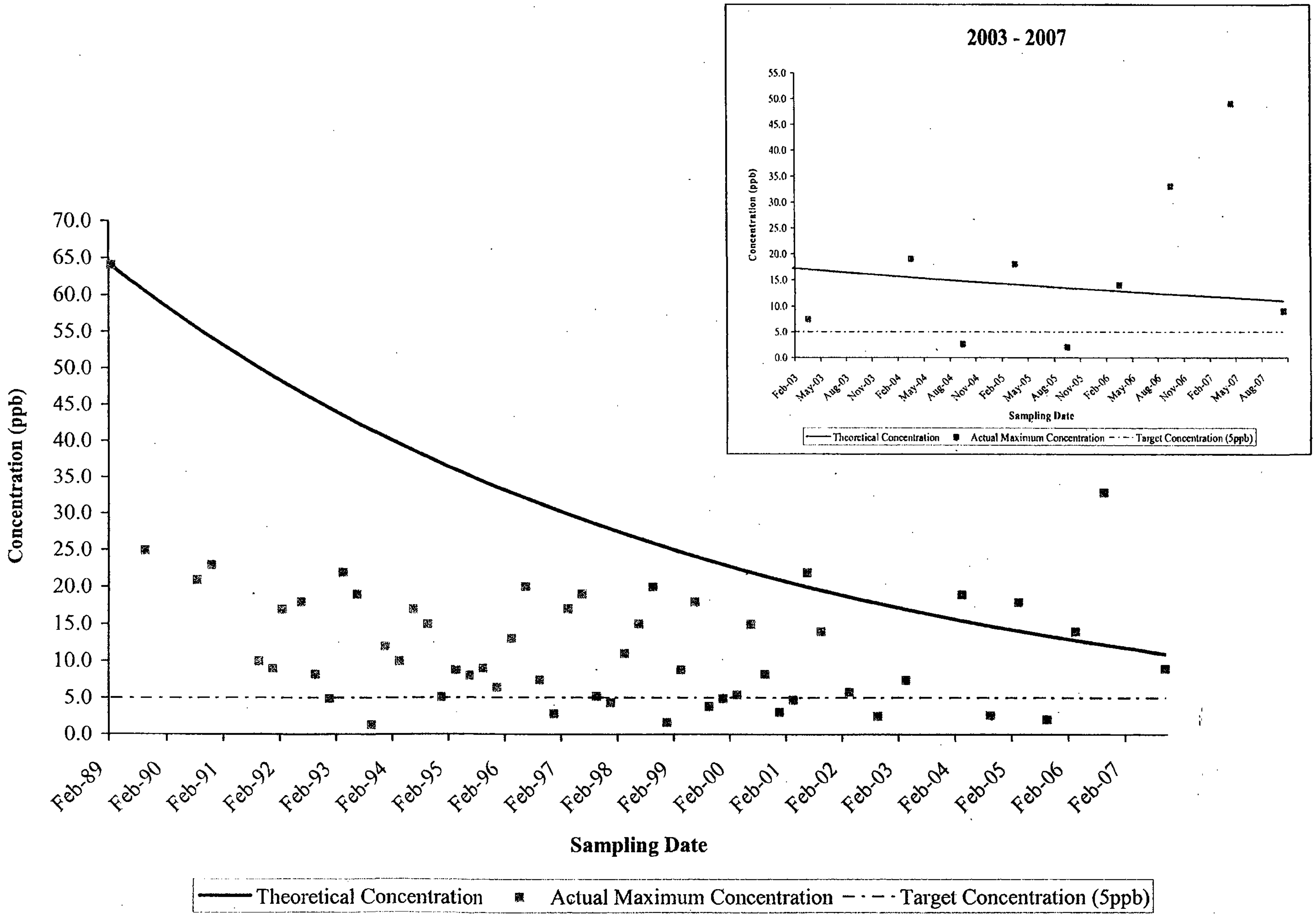
Sampling Month	x	Theoretical Concentration (ppb)	Actual Maximum Concentration (ppb)	Y_i (Difference of Theoretical and Actual)	Absolute Value Y_i	R_i (Ranking)	W_i (Value Weight)	$(R_i)(W_i)$	n (No. of Events)
February-89	-25	64.0	64.0	0.0	0.0	1	0	0	1
September-89	-18	60.5	25.0	-35.5	35.5	50	0	0	2
August-90	-7	55.5	21.0	-34.5	34.5	49	0	0	3
November-90	-4	54.2	23.0	-31.2	31.2	47	0	0	4
September-91	6	50.2	10.0	-40.2	40.2	55	0	0	5
December-91	9	49.0	9.0	-40.0	40.0	54	0	0	6
February-92	11	48.2	17.0	-31.2	31.2	46	0	0	7
June-92	15	46.7	18.0	-28.7	28.7	44	0	0	8
September-92	18	45.7	8.2	-37.5	37.5	52	0	0	9
December-92	21	44.6	4.9	-39.7	39.7	53	0	0	10
March-93	24	43.6	22.0	-21.6	21.6	30	0	0	11
June-93	27	42.6	19.0	-23.6	23.6	34	0	0	12
September-93	30	41.6	1.3	-40.3	40.3	56	0	0	13
December-93	33	40.6	12.0	-28.6	28.6	43	0	0	14
March-94	36	39.7	10.0	-29.7	29.7	45	0	0	15
June-94	39	38.7	17.0	-21.7	21.7	31	0	0	16
September-94	42	37.8	15.0	-22.8	22.8	32	0	0	17
December-94	45	37.0	5.1	-31.9	31.9	48	0	0	18
March-95	48	36.1	8.8	-27.3	27.3	41	0	0	19
June-95	51	35.3	8.0	-27.3	27.3	40	0	0	20
September-95	54	34.4	9.0	-25.4	25.4	38	0	0	21
December-95	57	33.6	6.4	-27.2	27.2	39	0	0	22
March-96	60	32.9	13.0	-19.9	19.9	28	0	0	23
June-96	63	32.1	20.0	-12.1	12.1	15	0	0	24
September-96	66	31.4	7.4	-24.0	24.0	37	0	0	25
December-96	69	30.6	2.8	-27.8	27.8	42	0	0	26
March-97	72	29.9	17.0	-12.9	12.9	18	0	0	27
June-97	75	29.2	19.0	-10.2	10.2	12	0	0	28
September-97	78	28.5	5.2	-23.3	23.3	33	0	0	29
December-97	81	27.9	4.3	-23.6	23.6	35	0	0	30
March-98	84	27.2	11.0	-16.2	16.2	23	0	0	31
June-98	87	26.6	15.0	-11.6	11.6	14	0	0	32
September-98	90	26.0	20.0	-6.0	6.0	8	0	0	33
December-98	93	25.4	1.6	-23.8	23.8	36	0	0	34
March-99	96	24.8	8.8	-16.0	16.0	22	0	0	35
June-99	99	24.2	18.0	-6.2	6.2	9	0	0	36
September-99	102	23.7	3.8	-19.9	19.9	27	0	0	37
December-99	105	23.1	4.9	-18.2	18.2	26	0	0	38
March-00	108	22.6	5.4	-17.2	17.2	24	0	0	39
June-00	111	22.0	15.0	-7.0	7.0	10	0	0	40
September-00	114	21.5	8.2	-13.3	13.3	19	0	0	41
December-00	117	21.0	3.0	-18.0	18.0	25	0	0	42
March-01	120	20.5	4.7	-15.8	15.8	21	0	0	43
June-01	123	20.1	22.0	1.9	1.9	3	1	3	44
September-01	126	19.6	14.0	-5.6	5.6	7	0	0	45
March-02	132	18.7	5.8	-12.9	12.9	17	0	0	46
September-02	138	17.8	2.5	-15.3	15.3	20	0	0	47
March-03	144	17.0	7.4	-9.6	9.6	11	0	0	48
March-04	156	15.5	19.0	3.5	3.5	5	1	5	49
September-04	162	14.8	2.6	-12.2	12.2	16	0	0	50
March-05	168	14.1	18.0	3.9	3.9	6	1	6	51
September-05	174	13.5	2.0	-11.5	11.5	13	0	0	52
March-06	180	12.8	14	1.2	1.2	2	1	2	53
September-06	186	12.3	33	20.7	-20.7	29	1	29	54
April-07	193	11.6	49	37.4	37.4	51	1	51	55
October-07	200	11.0	9	-2.0	2.0	4	0	0	55

Signed Rank Test Passed Since $T^+ =$ Sum$(R_i)(W_i)$ = 96

$T^+ < t(\alpha,n)$ $t(0.05, 55) =$ 466

mean	29.72	12.06	mean is lower
sdevp	11.83	8.61	Outlier - none
cv	0.40	0.71	
ttest	3.24E-12		t-test passed
correl	-0.003		negative correlation

Theoretical Attenuation vs Actual Concentrations
Tetrachloroethene (PCE)



WILCOXON SIGNED RANK TEST FOR TRICHLOROETHENE (TCE)

October 2007 Sampling Event

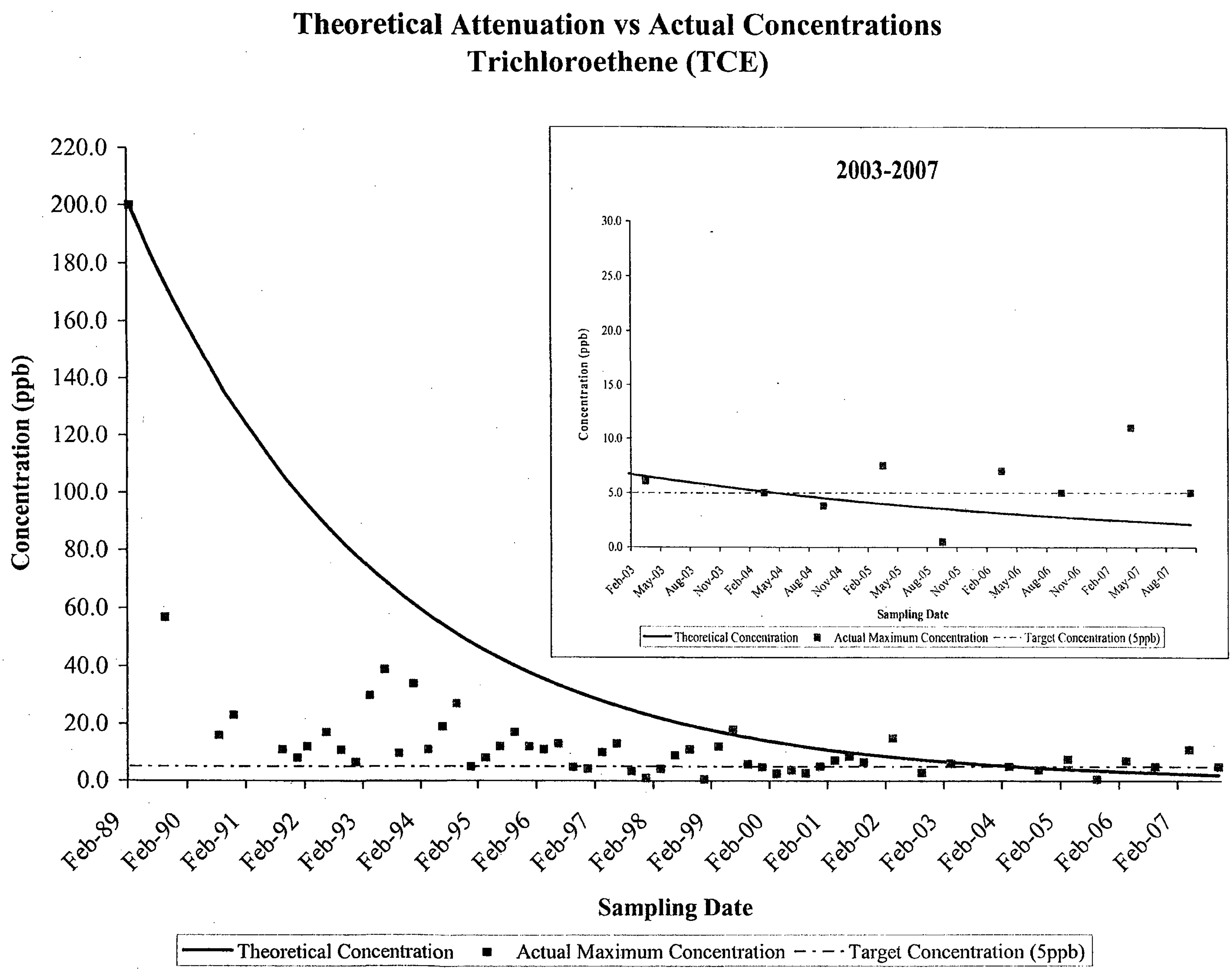
Target Concentration - 5.0 ppb

Sampling Month	x	Theoretical Concentration (ppb)	Actual Maximum Concentration (ppb)	Y_i (Difference of Theoretical and Actual)	Absolute Value Y_i	R_i (Ranking)	W_i (Value Weight)	$(R_i)(W_i)$	n (No. of Events)
February-89	-25	200.0	200 0	0.0	0.0	1	0	0	1
September-89	-18	173.5	57 0	-116.5	116.5	55	0	0	2
August-90	-7	138.8	16.0	-122.8	122.8	56	0	0	3
November-90	-4	130.6	23.0	-107 6	107.6	54	0	0	4
September-91	6	106.7	11.0	-95.7	95 7	53	0	0	5
December-91	9	100 4	8 0	-92.4	92.4	52	0	0	6
February-92	11	96.4	12 0	-84 4	84 4	51	0	0	7
June-92	15	88.9	17.0	-71.9	71.9	48	0	0	8
September-92	18	83.6	10.8	-72.8	72.8	50	0	0	9
December-92	21	78.7	6.5	-72.2	72.2	49	0	0	10
March-93	24	74.1	30.0	-44 1	44.1	45	0	0	11
June-93	27	69.7	39 0	-30.7	30.7	40	0	0	12
September-93	30	65.6	9.7	-55.9	55.9	47	0	0	13
December-93	33	61.7	34.0	-27.7	27.7	39	0	0	14
March-94	36	58.1	11.0	-47.1	47.1	46	0	0	15
June-94	39	54.7	19.0	-35.7	35 7	42	0	0	16
September-94	42	51.4	27.0	-24.4	24.4	34	0	0	17
December-94	45	48.4	4.9	-43 5	43.5	44	0	0	18
March-95	48	45.5	8.0	-37.5	37.5	43	0	0	19
June-95	51	42.9	12.0	-30.9	30.9	41	0	0	20
September-95	54	40.3	17.0	-23.3	23.3	33	0	0	21
December-95	57	37.9	12.0	-25.9	25.9	37	0	0	22
March-96	60	35.7	11.0	-24.7	24.7	35	0	0	23
June-96	63	33.6	13 0	-20.6	20.6	30	0	0	24
September-96	66	31.6	4.8	-26.8	26.8	38	0	0	25
December-96	69	29.8	4.1	-25 7	25.7	36	0	0	26
March-97	72	28.0	10.0	-18.0	18.0	29	0	0	27
June-97	75	26.4	13.0	-13 4	13.4	26	0	0	28
September-97	78	24.8	3 3	-21.5	21.5	31	0	0	29
December-97	81	23.3	1.0	-22 3	22.3	32	0	0	30
March-98	84	22.0	4.1	-17.9	17.9	28	0	0	31
June-98	87	20 7	8.9	-11.8	11.8	25	0	0	32
September-98	90	19.4	11.0	-8 4	8 4	18	0	0	33
December-98	93	18 3	0.5	-17.8	17.8	27	0	0	34
March-99	96	17 2	12.0	-5.2	5.2	15	0	0	35
June-99	99	16.2	18.0	1.8	1.8	6	1	6	36
September-99	102	15.2	5.8	-9 4	9 4	22	0	0	37
December-99	105	14.3	4 8	-9 5	9.5	23	0	0	38
March-00	108	13.5	2.5	-11 0	11.0	24	0	0	39
June-00	111	12.7	3.7	-9.0	9.0	20	0	0	40
September-00	114	12.0	2.7	-9.3	9.3	21	0	0	41
December-00	117	11.3	5.0	-6.3	6.3	16	0	0	42
March-01	120	10.6	7.2	-3.4	3.4	11	0	0	43
June-01	123	10.0	8.5	-1.5	1.5	5	0	0	44
September-01	126	9.4	6.5	-2 9	2.9	8	0	0	45
March-02	132	8.3	15.0	6.7	6.7	17	1	17	46
September-02	138	7 4	2.8	-4 6	4 6	14	0	0	47
March-03	144	6.5	6.1	-0.4	0 4	3	0	0	48
March-04	156	5.1	5.0	-0.1	0.1	2	0	0	49
September-04	162	4.5	3.8	-0.7	0.7	4	0	0	50
March-05	168	4.0	7.5	3.5	3.5	12	1	12	51
September-05	174	3.5	0 5	-3.0	3.0	10	0	0	52
March-06	180	3 1	7	3 9	3 9	13	1	13	53
September-06	186	2.8	5	2.2	2.2	7	1	7	54
April-07	193	2.4	11	8.6	8.6	19	1	19	55
October-07	200	2.1	5	2.9	2.9	9	1	9	55

Signed Rank Test Passed Since $T^- =$ Sum$(R_i)(W_i) =$ **83**

$T^- < t(\alpha,n)$ **t(0.05, 55) = 466**

mean	36 67	10.33	mean is lower
sdevp	34.17	8.05	Outlier - none
cv	0.93	0.78	
ttest	4.22E-08		t-test passed
correl	0.507		positive correlation



Theoretical Attenuation vs Actual Concentrations
Trichloroethene (TCE)
Concentration (ppb)
220.0
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Feb-89
Feb-90
Feb-91
Feb-92
Feb-93
Feb-94
Feb-95
Feb-96
Feb-97
Feb-98
Feb-99
Feb-00
Feb-01
Feb-02
Feb-03
Feb-04
Feb-05
Feb-06
Feb-07
Sampling Date
Theoretical Concentration
Actual Maximum Concentration
Target Concentration (5ppb)
2003-2007
Concentration (ppb)
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Feb-03
May-03
Aug-03
Nov-03
Feb-04
May-04
Aug-04
Nov-04
Feb-05
May-05
Aug-05
Nov-05
Feb-06
May-06
Aug-06
Nov-06
Feb-07
May-07
Aug-07
Sampling Date
Theoretical Concentration
Actual Maximum Concentration
Target Concentration (5ppb)

WILCOXON SIGNED RANK TEST FOR VINYL CHLORIDE

October 2007 Sampling Event

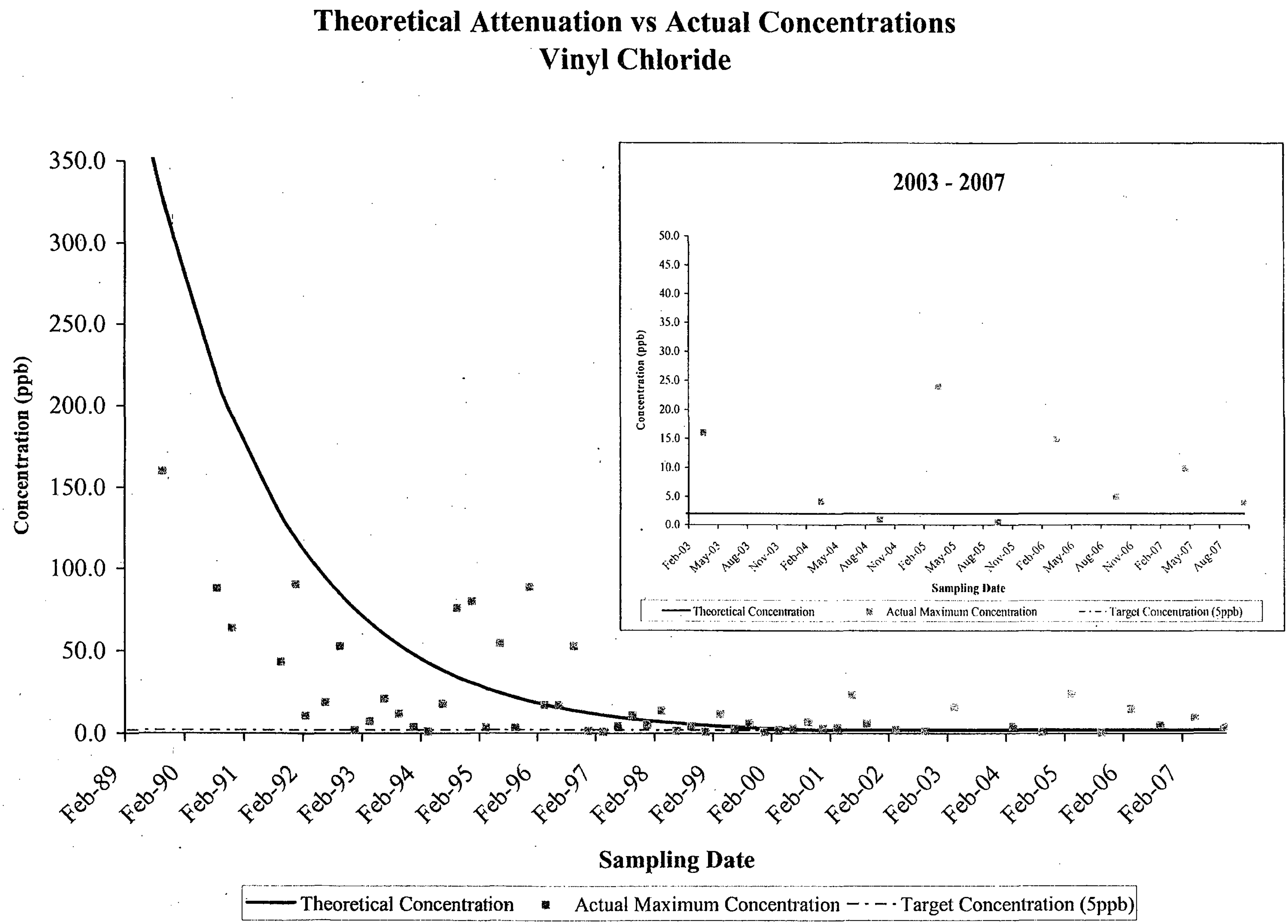
Target Concentration - 2.0 ppb

Sampling Month	x	Theoretical Concentration (ppb)	Actual Maximum Concentration (ppb)	Y_i (Difference of Theoretical and Actual)	Absolute Value Y_i	R_i (Ranking)	W_i (Value Weight)	$(R_i)(W_i)$	n (No. of Events)
February-89	-25	430 0	430.0	0.0	0.0	1	0	0	1
September-89	-18	329.9	160.0	-169.9	169.9	56	0	0	2
August-90	-7	217.8	88.0	-129 8	129.8	54	0	0	3
November-90	-4	194.4	64.0	-130.4	130.4	55	0	0	4
September-91	6	133.3	43.5	-89.8	89.8	52	0	0	5
December-91	9	119 0	90.5	-28 5	28.5	38	0	0	6
February-92	11	110.4	11.0	-99.4	99.4	53	0	0	7
June-92	15	94.9	19.0	-75.9	75.9	51	0	0	8
September-92	18	84 7	53.0	-31.7	31.7	40	0	0	9
December-92	21	75.6	2.0	-73.6	73 6	50	0	0	10
March-93	24	67.5	7.4	-60.1	60.1	48	0	0	11
June-93	27	60.3	21.0	-39.3	39.3	42	0	0	12
September-93	30	53.9	12.0	-41.9	41.9	45	0	0	13
December-93	33	48.1	3.9	-44.2	44.2	46	0	0	14
March-94	36	42.9	1.1	-41 8	41.8	44	0	0	15
June-94	39	38.3	18.0	-20.3	20.3	34	0	0	16
September-94	42	34.2	76.0	41.8	41.8	43	1	43	17
December-94	45	30.6	80.0	49.4	49.4	47	1	47	18
March-95	48	27.3	3.8	-23 5	23.5	37	0	0	19
June-95	51	24 4	54.5	30 1	30.1	39	1	39	20
September-95	54	21 8	3.5	-18.3	18.3	33	0	0	21
December-95	57	19.4	88.5	69 1	69 1	49	1	49	22
March-96	60	17.3	17.0	-0.3	0.3	3	0	0	23
June-96	63	15 5	17.0	1.5	1.5	13	1	13	24
September-96	66	13.8	53.0	39.2	39.2	41	1	41	25
December-96	69	12.3	1.5	-10.8	10.8	30	0	0	26
March-97	72	11.0	1.0	-10.0	10 0	29	0	0	27
June-97	75	9.8	4.4	-5.4	5.4	25	0	0	28
September-97	78	8.8	11.0	2 2	2.2	17	1	17	29
December-97	81	7.8	5.2	-2 6	2.6	18	0	0	30
March-98	84	7.0	14.0	7.0	7.0	26	1	26	31
June-98	87	6 3	1.6	-4 7	4.7	23	0	0	32
September-98	90	5.6	4 4	-1.2	1 2	10	0	0	33
December-98	93	5.0	1 0	-4.0	4 0	21	0	0	34
March-99	96	4.5	12.0	7.5	7.5	27	1	27	35
June-99	99	4.0	3.0	-1 0	1 0	7	0	0	36
September-99	102	3 6	6.4	2.8	2 8	19	1	19	37
December-99	105	3 2	1.0	-2.2	2.2	15	0	0	38
March-00	108	2.8	2.3	-0.5	0.5	4	0	0	39
June-00	111	2.5	3.1	0.6	0.6	5	1	5	40
September-00	114	2.3	7.1	4.8	4.8	24	1	24	41
December-00	117	2.0	3.0	1.0	1.0	8	1	8	42
March-01	120	2 0	3.4	1.4	1.4	11	1	11	43
June-01	123	2.0	23.0	21.0	21 0	35	1	35	44
September-01	126	2.0	6 0	4.0	4.0	22	1	22	45
March-02	132	2 0	2 1	0.1	0.1	2	1	2	46
September-02	138	2 0	1 2	-0 8	0 8	6	0	0	47
March-03	144	2 0	16.0	14.0	14 0	32	1	32	48
March-04	156	2.0	4.2	2.2	2.2	16	1	16	49
September-04	162	2 0	1.0	-1.0	1.0	9	0	0	50
March-05	168	2 0	24.0	22.0	22.0	36	1	36	51
September-05	174	2.0	0.5	-1 5	1.5	12	0	0	52
March-06	180	2.0	15	13.0	13.0	31	1	31	53
September-06	186	2.0	5	3.0	3.0	20	1	20	54
April-07	193	2 0	10	8.0	8 0	28	1	28	55
October-07	200	2 0	4	2 0	2 0	14	1	14	55

Signed Rank Test Failed Since $T^+ =$ Sum$(R_i)(W_i)$ = 605

$T^+ > t(\alpha,n)$ $t(0.05, 55) =$ 466

mean	30.96	18.98	mean is lower
sdevp	47.54	25.67	Outlier - none
cv	1.54	1.35	
ttest	1 48E-02		t-test passed (0.0148 vs 0 05)
correl	0.572		positive correlation

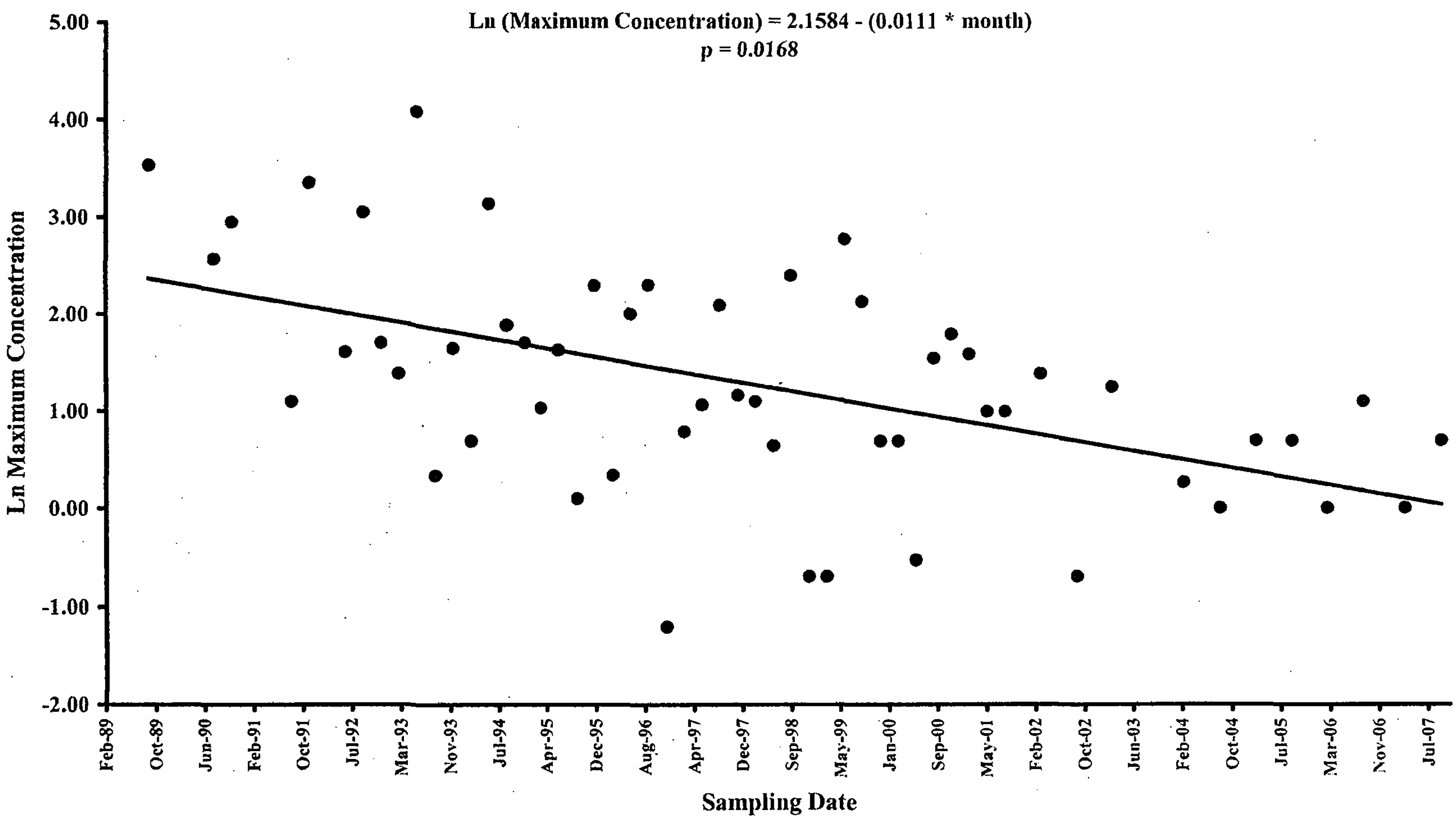


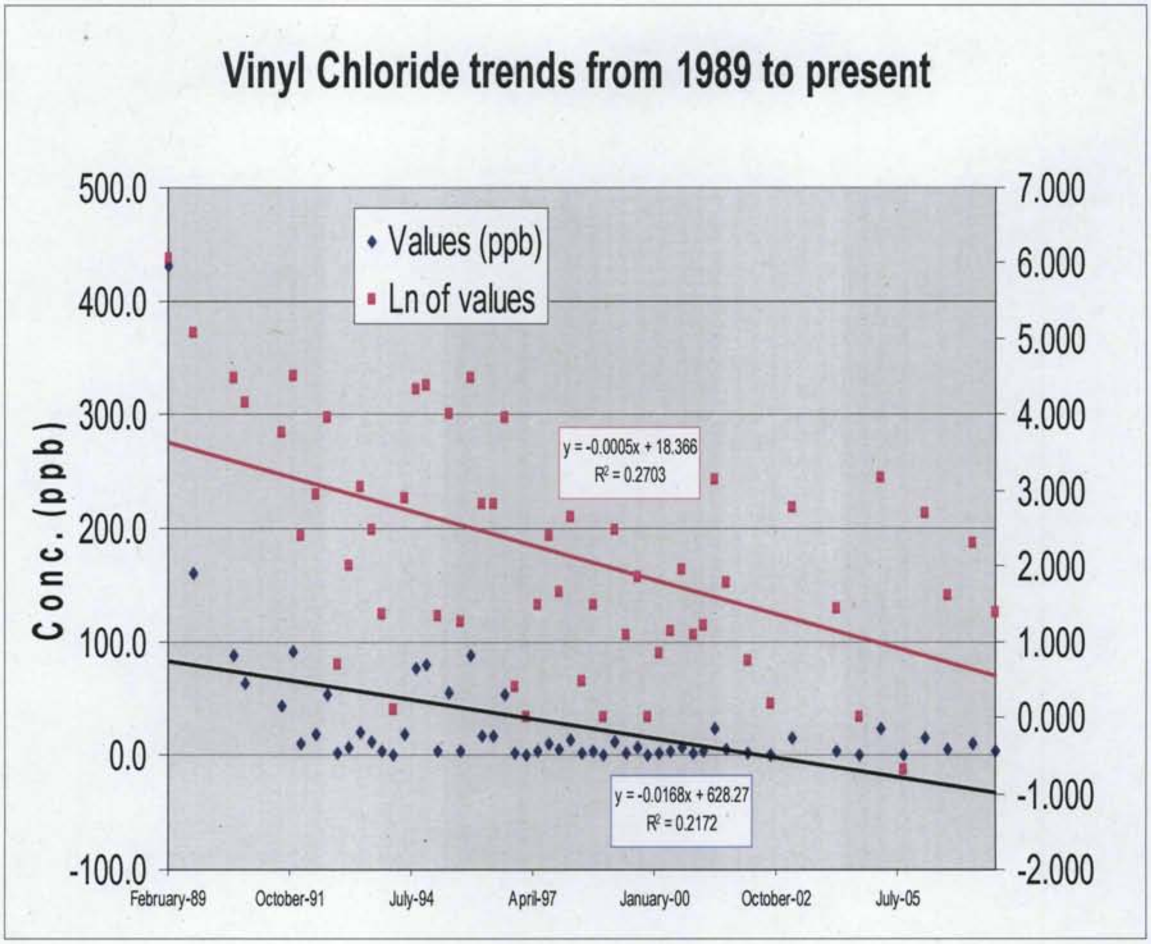
Theoretical Attenuation vs Actual Concentrations
Vinyl Chloride
Concentration (ppb)
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Feb-89
Feb-90
Feb-91
Feb-92
Feb-93
Feb-94
Feb-95
Feb-96
Feb-97
Feb-98
Feb-99
Feb-00
Feb-01
Feb-02
Feb-03
Feb-04
Feb-05
Feb-06
Feb-07
Sampling Date
Theoretical Concentration
Actual Maximum Concentration
Target Concentration (5ppb)
2003 - 2007
Concentration (ppb)
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Feb-03
May-03
Aug-03
Nov-03
Feb-04
May-04
Aug-04
Nov-04
Feb-05
May-05
Aug-05
Nov-05
Feb-06
May-06
Aug-06
Nov-06
Feb-07
May-07
Aug-07
Sampling Date
Theoretical Concentration
Actual Maximum Concentration
Target Concentration (5ppb)

LEAST SQUARES REGRESSION FOR BENZENE
October 2007 Sampling Event

Month of Sampling	Month	Actual Maximum Concentration (ppb)	Log of Maximum Concentration	Predicted
September-89	-18	34.0	3.5264	2.2359
August-90	-7	13.0	2.5649	
November-90	-4	19.0	2.9444	
September-91	6	3.0	1.0986	
December-91	9	28.5	3.3499	
June-92	15	5.0	1.6094	
September-92	18	21.0	3.0445	
December-92	21	5.5	1.7047	
March-93	24	4.0	1.3863	
June-93	27	59.0	4.0775	
September-93	30	1.4	0.3365	
December-93	33	5.2	1.6487	
March-94	36	2.0	0.6931	
June-94	39	23.0	3.1355	
September-94	42	6.6	1.8871	
December-94	45	5.5	1.7047	
March-95	48	2.8	1.0296	
June-95	51	5.1	1.6292	
September-95	54	1.1	0.0953	
December-95	57	9.9	2.2925	
March-96	60	1.4	0.3365	
June-96	63	7.4	2.0015	
September-96	66	10.0	2.3026	
December-96	69	0.3	-1.2040	
March-97	72	2.2	0.7885	
June-97	75	2.9	1.0647	
September-97	78	8.1	2.0919	
December-97	81	3.2	1.1632	
March-98	84	3.0	1.0986	
June-98	87	1.9	0.6419	
September-98	90	11.0	2.3979	
December-98	93	0.5	-0.6931	
March-99	96	0.5	-0.6931	
Jun-99	99	16	2.7726	
Sep-99	102	8.4	2.1282	
Dec-99	105	2.0	0.6931	
Mar-00	108	2	0.6931	
Jun-00	111	0.59	-0.5276	
Sep-00	114	4.7	1.5476	
Dec-00	117	6	1.7918	
Mar-01	120	4.9	1.5892	
Jun-01	123	2.7	0.9933	
Sep-01	126	2.7	0.9933	0.7643
Mar-02	132	4	1.3863	
Sep-02	138	0.5	-0.6931	
Mar-03	144	3.5	1.2528	
Mar-04	156	1.3	0.2624	
Sep-04	162	1	0.0000	
Mar-05	168	2	0.693147181	
Sep-05	174	2	0.693147181	
Mar-06	180	1	0	
Sep-06	186	3	1.098612289	
Apr-07	193	1	0	
Oct-07	200	2	0.693147181	

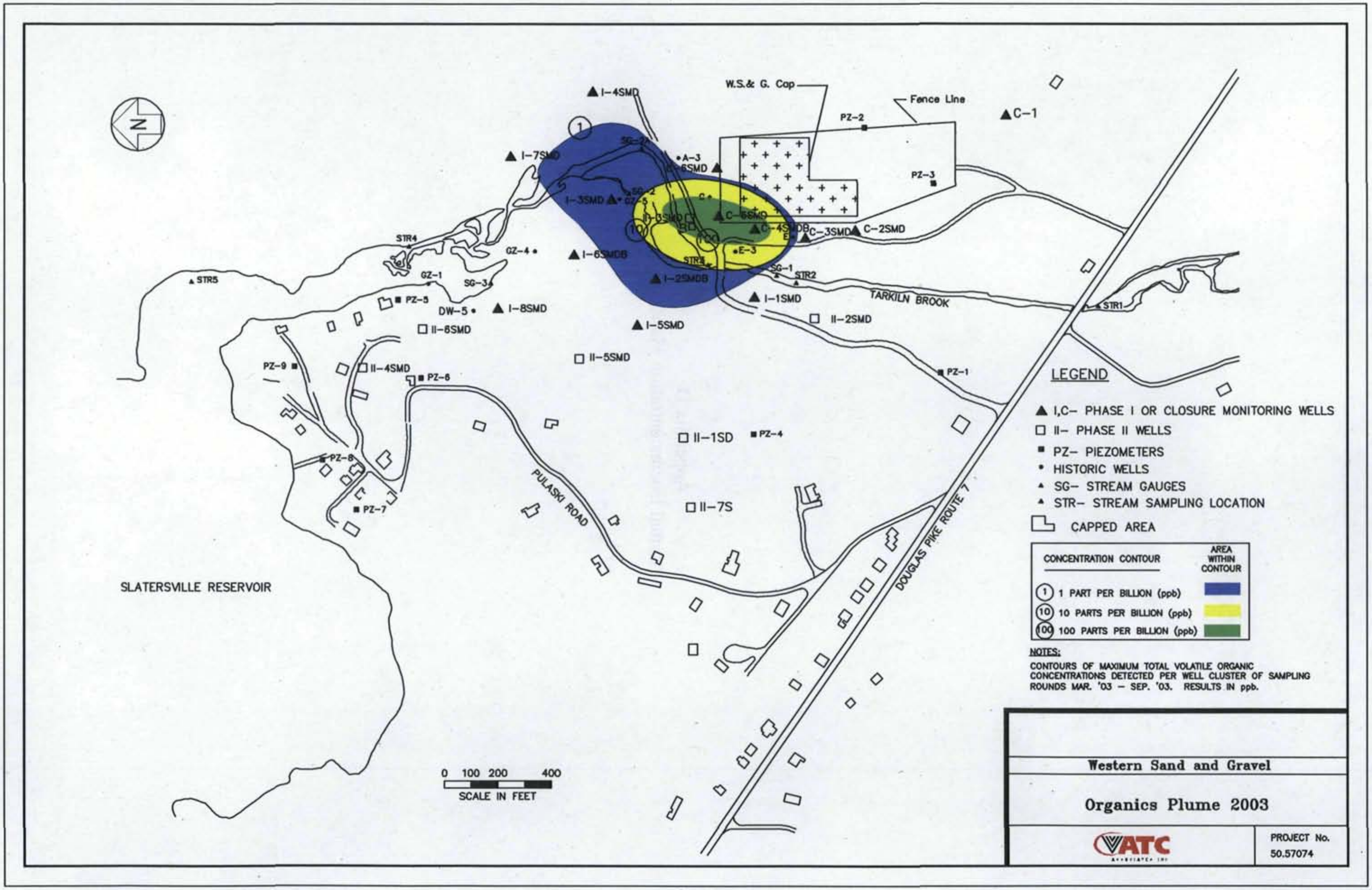
Least Squares Regression
Benzene



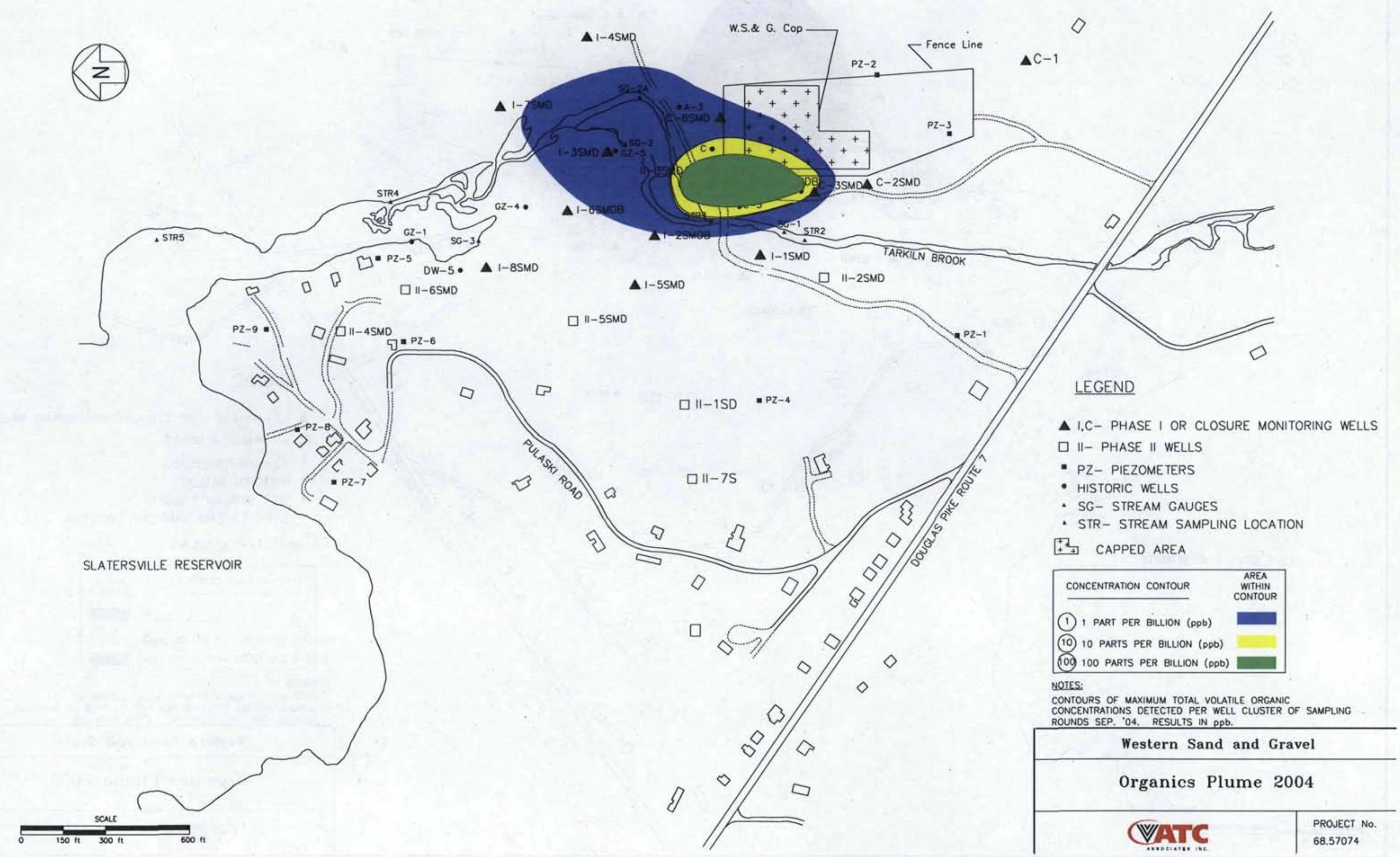


Vinyl Chloride trends from 1989 to present
Values (ppb)
Ln of values
Conc. (ppb)
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-2.000
y = -0.0005x + 18.366
R² = 0.2703
y = -0.0168x + 628.27
R² = 0.2172
February-89
October-91
July-94
April-97
January-00
October-02
July-05

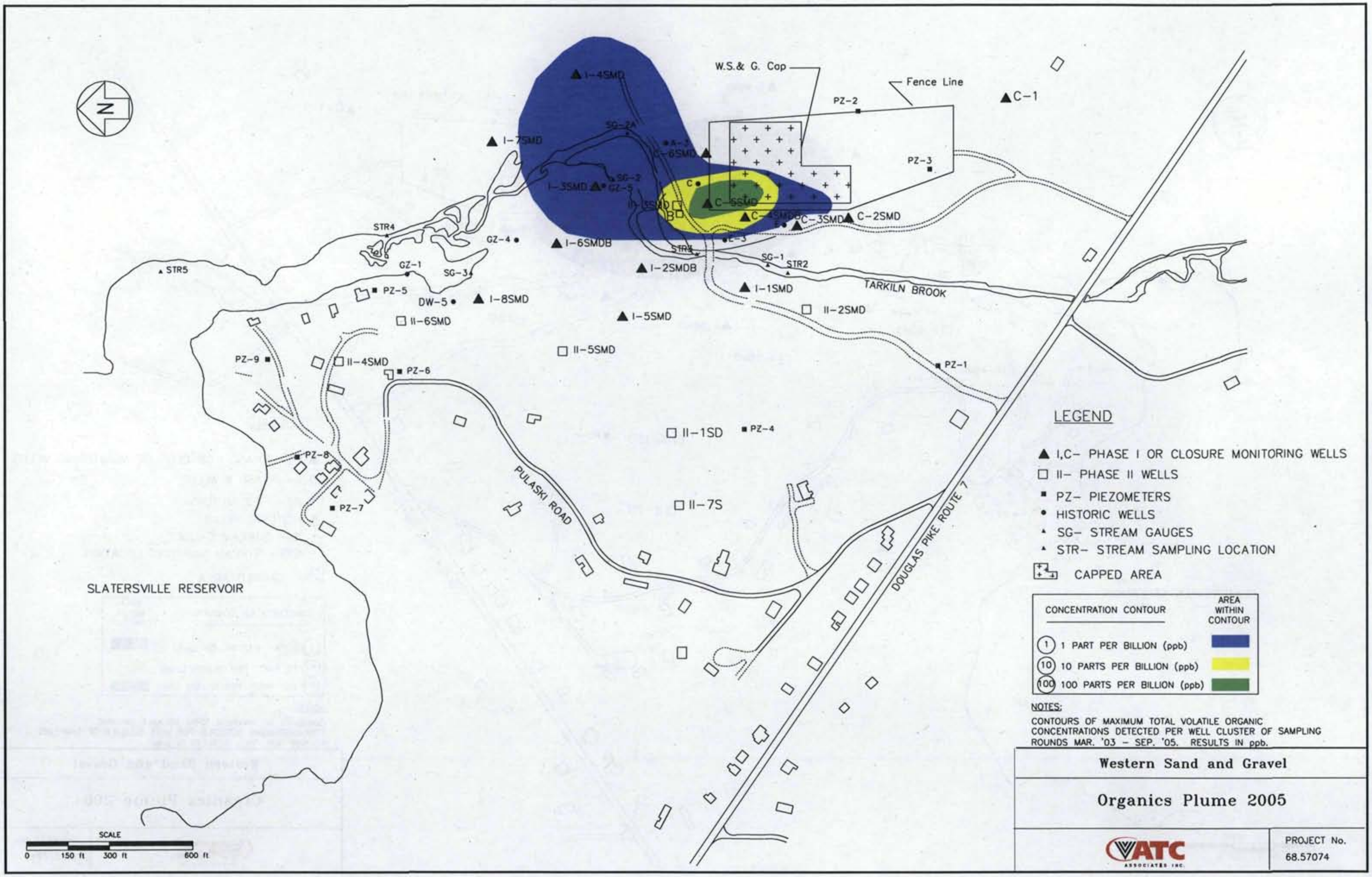
Appendix D
Annual Isoconcentration Maps



W.S.& G. Cap
Fence Line
PZ-2
PZ-3
C-1
I-4SMD
I-7SMD
SG-2
A-3
I-3SMD
II-3SMD
C-6SMD
C-4SMDB
C-3SMD
C-2SMD
E-3
STR3
SG-1
STR2
I-6SMDB
I-2SMDB
I-1SMD
II-2SMD
TARKILN BROOK
STR1
STR4
STR5
GZ-4
GZ-1
SG-3
PZ-5
DW-5
I-8SMD
II-6SMD
I-5SMD
II-5SMD
PZ-9
II-4SMD
PZ-6
PZ-1
II-1SD
PZ-4
PZ-8
PZ-7
II-7S
PULASKI ROAD
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
0 100 200 400
SCALE IN FEET
N
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
CONCENTRATION CONTOUR
AREA WITHIN CONTOUR
1 PART PER BILLION (ppb)
10 PARTS PER BILLION (ppb)
100 PARTS PER BILLION (ppb)
NOTES:
CONTOURS OF MAXIMUM TOTAL VOLATILE ORGANIC CONCENTRATIONS DETECTED PER WELL CLUSTER OF SAMPLING ROUNDS MAR. '03 - SEP. '03. RESULTS IN ppb.
Western Sand and Gravel
Organics Plume 2003
ATC
PROJECT No.
50.57074



N
W.S.& G. Cop
Fence Line
I-4SMD
PZ-2
C-1
I-7SMD
SG-2A
A-3
C-6SMD
PZ-3
I-3SMD
SG-2
GZ-5
C
II-3SD
C-3SMD
C-2SMD
STR4
GZ-4
I-6SMDB
STR5
GZ-1
SG-3
I-2SMDB
SG-1
STR2
I-1SMD
TARKILN BROOK
PZ-5
DW-5
I-8SMD
II-6SMD
I-5SMD
II-2SMD
II-5SMD
PZ-9
II-4SMD
PZ-6
PZ-1
II-1SD
PZ-4
PZ-8
PULASKI ROAD
II-7S
PZ-7
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
SCALE
0
150 ft
300 ft
600 ft
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
CONCENTRATION CONTOUR
AREA WITHIN CONTOUR
1 1 PART PER BILLION (ppb)
10 10 PARTS PER BILLION (ppb)
100 100 PARTS PER BILLION (ppb)
NOTES:
CONTOURS OF MAXIMUM TOTAL VOLATILE ORGANIC CONCENTRATIONS DETECTED PER WELL CLUSTER OF SAMPLING ROUNDS SEP. '04. RESULTS IN ppb.
Western Sand and Gravel
Organics Plume 2004
ATC ASSOCIATES INC.
PROJECT No.
68.57074



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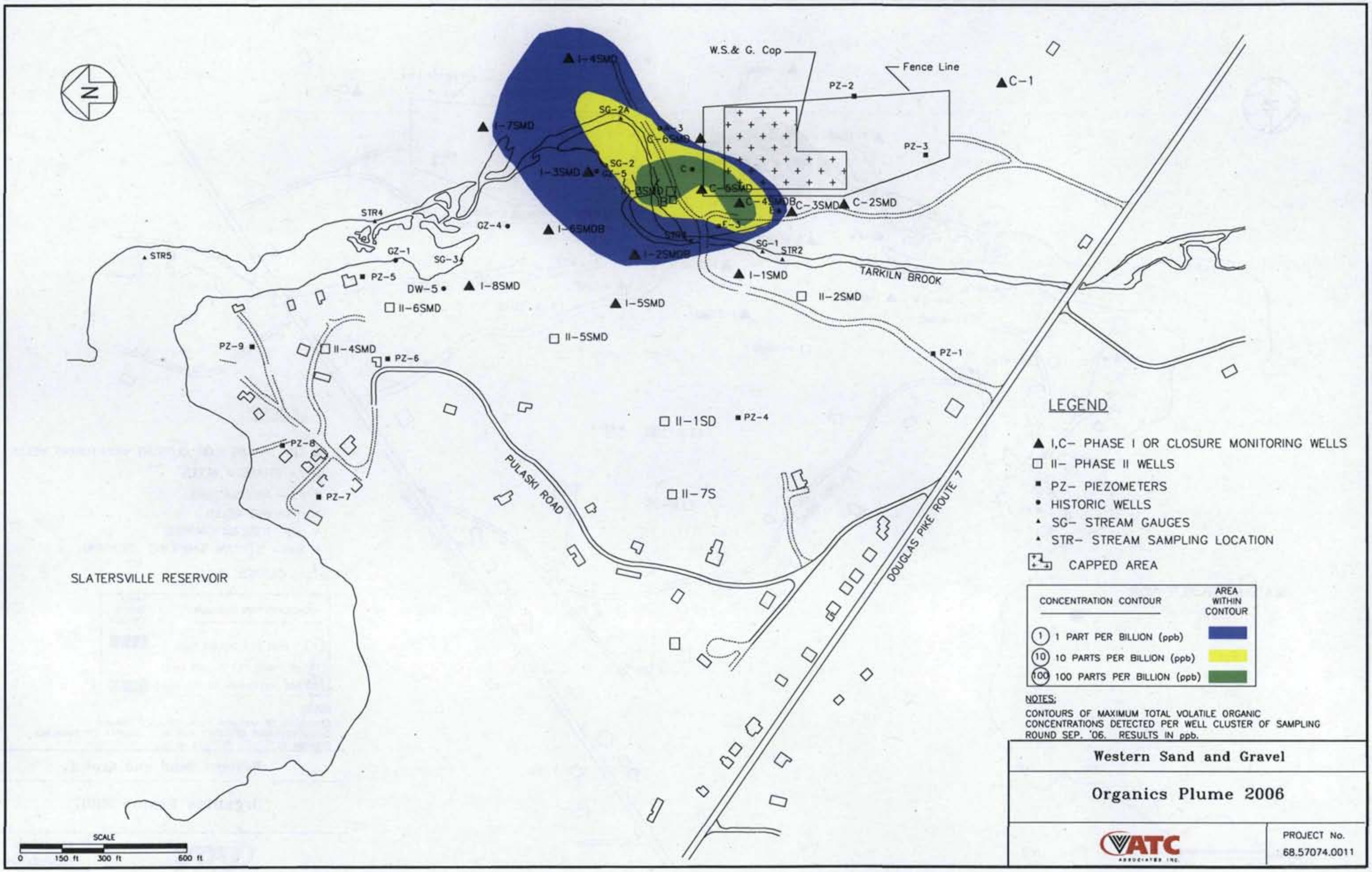
Fence Line
PZ-2
PZ-3
C-1
I-4SMD
I-7SMD
SG-2A
A-3
C-6SMD
I-3SMD
SG-2
GZ-5
C
II-3SMD
B
C-5SMD
C-4SMDB
C-3SMD
C-2SMD
E
E-3
STR3
SG-1
STR2
STR4
STR5
GZ-4
GZ-1
SG-3
I-6SMDB
I-2SMDB
I-1SMD
I-8SMD
PZ-5
DW-5
II-6SMD
I-5SMD
II-2SMD
TARKILN BROOK
II-5SMD
PZ-9
II-4SMD
PZ-6
PZ-1
PZ-8
PZ-7
II-1SD
PZ-4
II-7S
PULASKI ROAD
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
SCALE
0
150 ft
300 ft
600 ft
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
CONCENTRATION CONTOUR
AREA WITHIN CONTOUR
1 1 PART PER BILLION (ppb)
10 10 PARTS PER BILLION (ppb)
100 100 PARTS PER BILLION (ppb)
NOTES:
CONTOURS OF MAXIMUM TOTAL VOLATILE ORGANIC CONCENTRATIONS DETECTED PER WELL CLUSTER OF SAMPLING ROUNDS MAR. '03 - SEP. '05. RESULTS IN ppb.
Western Sand and Gravel
Organics Plume 2005
ATC ASSOCIATES INC.
PROJECT No.
68.57074



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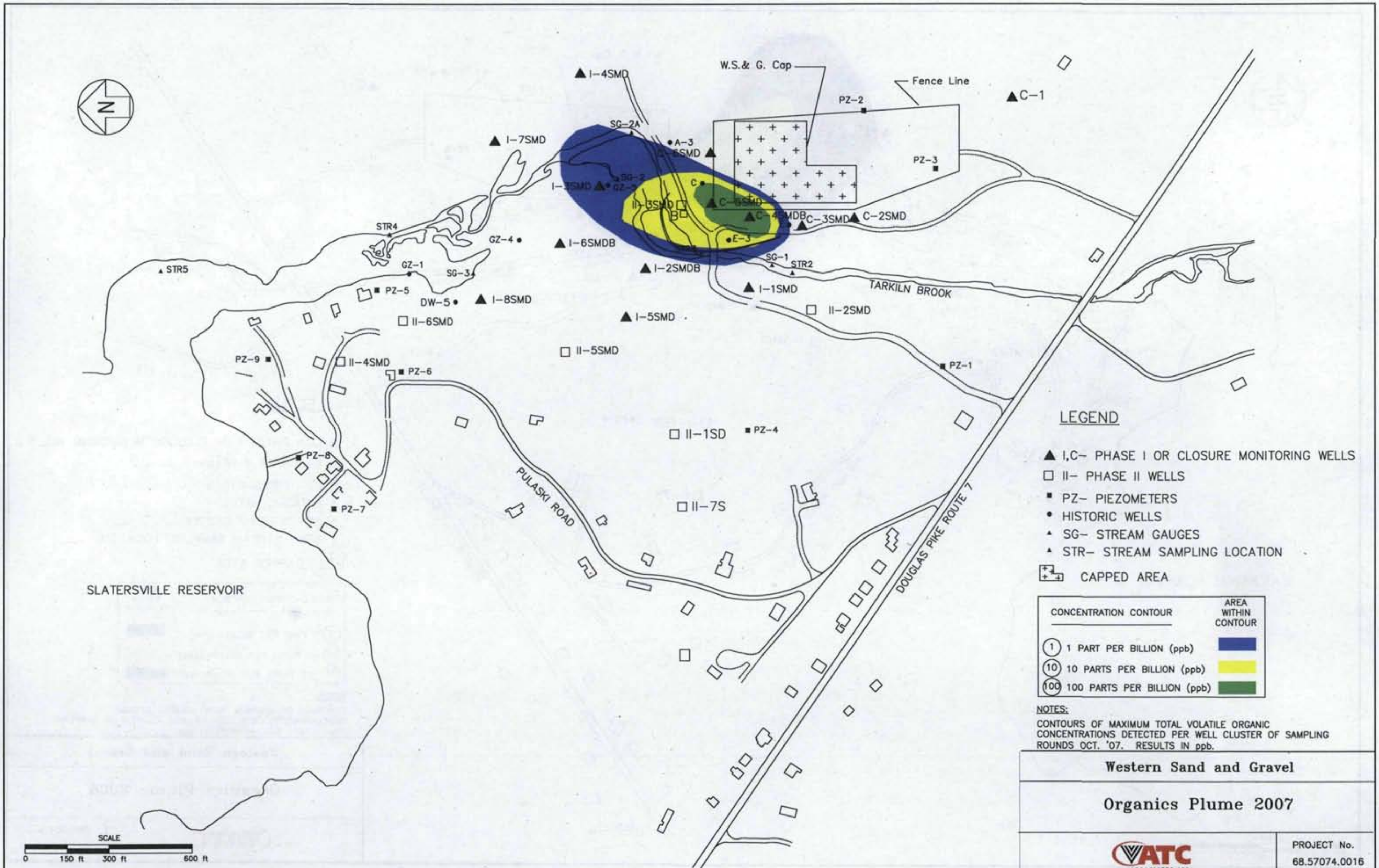
Fence Line
I-4SMD
I-7SMD
SG-2A
C-6SMD
SG-2
I-3SMD
GZ-5
C-5SMD
C-4SMDB
C-3SMD
C-2SMD
C-1
PZ-2
PZ-3
STR4
GZ-4
I-6SMDB
I-2SMDB
STR5
GZ-1
SG-3
PZ-5
DW-5
I-8SMD
SG-1
STR2
I-1SMD
I-5SMD
TARKILN BROOK
II-2SMD
II-6SMD
II-5SMD
PZ-9
II-4SMD
PZ-6
PZ-1
II-1SD
PZ-4
PZ-8
PZ-7
PULASKI ROAD
II-7S
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
CONCENTRATION CONTOUR
AREA WITHIN CONTOUR
1 1 PART PER BILLION (ppb)
10 10 PARTS PER BILLION (ppb)
100 100 PARTS PER BILLION (ppb)
NOTES:
CONTOURS OF MAXIMUM TOTAL VOLATILE ORGANIC CONCENTRATIONS DETECTED PER WELL CLUSTER OF SAMPLING ROUND SEP. '06. RESULTS IN ppb.
Western Sand and Gravel
Organics Plume 2006
ATC ASSOCIATES INC.
PROJECT No. 68.57074.0011
SCALE
0 150 ft 300 ft 600 ft



Western Sand and Gravel

Organics Plume 2007

ATC ASSOCIATES INC.

PROJECT No.
68.57074.0016

Appendix E
Piezometric Data & Groundwater Flow Maps

WESTERN SAND AND GRAVEL PIEZOMETRIC ELEVATIONS
FOR SEPTEMBER 2003 SAMPLING EVENT

Location	September 2003 Elevation
C1D	286.55
C2S	256.22
C2M	256.23
C2D	256.14
C3S	255.89
C3M	255.85
C3D	255.93
C4S	255.40
C4M	255.41
C4D	255.45
C4B	
C5S	255.41
C5M	255.30
C5D	255.35
C6S	255.91
C6M	255.59
C6D	255.60

I1S	
I1M	
I1D	
I2S	254.58
I2M	254.60
I2D	254.55
I3S	253.30
I3M	254.22
I3D	254.21
I4S	258.75
I4M	256.10
I4D	255.85
I5S	
I5M	
I5D	
I6S	253.71
I6M	253.89
I6D	253.85
I7S	253.01
I7M	254.15
I7D	254.20
I8S	
I8M	
I8D	

Location	September 2003 Elevation
II1S	
II1D	
II2S	
II2M	
II2D	
II3S	255.41
II3M	255.40
II3D	255.39
II3B	
II4S	
II4M	
II4D	
II5S	
II5M	
II5D	
II6S	
II6M	
II6D	
II7S	

STREAM GAUGES

SG1	Under Water
SG2	252.10
SG2A	252.50
SG3	251.80

PIEZOMETERS

PZ1	
PZ2	256.48
PZ3	257.30
PZ4	
PZ5	
PZ6	
PZ7	
PZ8	
PZ9	

HISTORIC WELLS

E	
E-3	
C	
A-3	
GZ-5	
GZ-4	
DW-5	No data
GZ-1	

: Wells temporarily sealed in 2001 in accordance with 8/7/01 EPA letter.
All elevations reference mean sea level.

WESTERN SAND AND GRAVEL PIEZOMETRIC ELEVATIONS
FOR SEPTEMBER 2004 SAMPLING EVENT

Location	September 2004 Elevation
C1D	0.00
C2S	0.00
C2M	0.00
C2D	0.00
C3S	0.00
C3M	0.00
C3D	0.00
C4S	0.00
C4M	0.00
C4D	0.00
C4B	
C5S	0.00
C5M	0.00
C5D	0.00
C6S	0.00
C6M	0.00
C6D	0.00

I1S	
I1M	
I1D	
I2S	0.00
I2M	0.00
I2D	0.00
I3S	0.00
I3M	0.00
I3D	0.00
I4S	0.00
I4M	0.00
I4D	0.00
I5S	
I5M	
I5D	
I6S	0.00
I6M	0.00
I6D	0.00
I7S	0.00
I7M	0.00
I7D	0.00
I8S	
I8M	
I8D	

Location	September 2004 Elevation
II1S	
II1D	
II2S	
II2M	
II2D	
II3S	255.41
II3M	255.40
II3D	255.39
II3B	
II4S	
II4M	
II4D	
II5S	
II5M	
II5D	
II6S	
II6M	
II6D	
II7S	

STREAM GAUGES

SG1	Under Water
SG2	0.00
SG2A	0.00
SG3	0.00

PIEZOMETERS

PZ1	
PZ2	0.00
PZ3	0.00
PZ4	
PZ5	
PZ6	
PZ7	
PZ8	
PZ9	

HISTORIC WELLS

E	
E-3	
C	
A-3	
GZ-5	
GZ-4	
DW-5	0.00
GZ-1	

: Wells temporarily sealed in 2001 in accordance with 8/7/01 EPA letter.
All elevations reference mean sea level.

WESTERN SAND AND GRAVEL PIEZOMETRIC ELEVATIONS
FOR SEPTEMBER 2005 SAMPLING EVENT

Location	September 2005 Elevation
C1D	0.00
C2S	0.00
C2M	0.00
C2D	0.00
C3S	0.00
C3M	0.00
C3D	0.00
C4S	0.00
C4M	0.00
C4D	0.00
C4B	
C5S	0.00
C5M	0.00
C5D	0.00
C6S	0.00
C6M	0.00
C6D	0.00

I1S	
I1M	
I1D	
I2S	0.00
I2M	0.00
I2D	0.00
I3S	0.00
I3M	0.00
I3D	0.00
I4S	0.00
I4M	0.00
I4D	0.00
I5S	
I5M	
I5D	
I6S	0.00
I6M	0.00
I6D	0.00
I7S	0.00
I7M	0.00
I7D	0.00
I8S	
I8M	
I8D	

Location	September 2005 Elevation
II1S	
II1D	
II2S	
II2M	
II2D	
II3S	255.41
II3M	255.40
II3D	255.39
II3B	
II4S	
II4M	
II4D	
II5S	
II5M	
II5D	
II6S	
II6M	
II6D	
II7S	

STREAM GAUGES

SG1	0.00
SG2	0.00
SG2A	0.00
SG3	0.00

PIEZOMETERS

PZ1	
PZ2	0.00
PZ3	0.00
PZ4	
PZ5	
PZ6	
PZ7	
PZ8	
PZ9	

HISTORIC WELLS

E	
E-3	
C	
A-3	
GZ-5	
GZ-4	
DW-5	0.00
GZ-1	

: Wells temporarily sealed in 2001 in accordance with 8/7/01 EPA letter.
All elevations reference mean sea level.

WESTERN SAND AND GRAVEL PIEZOMETRIC ELEVATIONS
FOR SEPTEMBER 2006 SAMPLING EVENT

Location	September 2006 Elevation
C1D	287.43
C2S	256.25
C2M	256.25
C2D	256.16
C3S	255.93
C3M	255.90
C3D	255.95
C4S	255.44
C4M	255.46
C4D	255.46
C4B	
C5S	255.51
C5M	255.37
C5D	255.44
C6S	256.10
C6M	255.89
C6D	255.83

I1S	
I1M	
I1D	
I2S	254.68
I2M	254.07
I2D	254.66
I3S	253.29
I3M	254.28
I3D	254.30
I4S	259.54
I4M	256.46
I4D	256.17
I5S	
I5M	
I5D	
I6S	253.76
I6M	253.98
I6D	253.92
I7S	254.18
I7M	254.28
I7D	254.36
I8S	
I8M	
I8D	

Location	September 2006 Elevation
II1S	
II1D	
II2S	
II2M	
II2D	
II3S	255.41
II3M	255.40
II3D	255.39
II3B	
II4S	
II4M	
II4D	
II5S	
II5M	
II5D	
II6S	
II6M	
II6D	
II7S	

STREAM GAUGES

SG1	253.90
SG2	253.30
SG2A	252.50
SG3	252.00

PIEZOMETERS

PZ1	
PZ2	257.02
PZ3	257.60
PZ4	
PZ5	
PZ6	
PZ7	
PZ8	
PZ9	

HISTORIC WELLS

E	
E-3	
C	
A-3	
GZ-5	
GZ-4	
DW-5	253.25
GZ-1	

: Wells temporarily sealed in 2001 in accordance with 8/7/01 EPA letter.
All elevations reference mean sea level.

WESTERN SAND AND GRAVEL PIEZOMETRIC ELEVATIONS
FOR SEPTEMBER 2007 SAMPLING EVENT

Location	September 2007 Elevation
C1D	0.00
C2S	0.00
C2M	0.00
C2D	0.00
C3S	0.00
C3M	0.00
C3D	0.00
C4S	0.00
C4M	0.00
C4D	0.00
C4B	
C5S	0.00
C5M	0.00
C5D	0.00
C6S	0.00
C6M	0.00
C6D	0.00

I1S	
I1M	
I1D	
I2S	0.00
I2M	0.00
I2D	0.00
I3S	0.00
I3M	0.00
I3D	0.00
I4S	0.00
I4M	0.00
I4D	0.00
I5S	
I5M	
I5D	
I6S	0.00
I6M	0.00
I6D	0.00
I7S	0.00
I7M	0.00
I7D	0.00
I8S	
I8M	
I8D	

Location	September 2007 Elevation
II1S	
II1D	
II2S	
II2M	
II2D	
II3S	255.41
II3M	255.40
II3D	255.39
II3B	
II4S	
II4M	
II4D	
II5S	
II5M	
II5D	
II6S	
II6M	
II6D	
II7S	

STREAM GAUGES

SG1	0.00
SG2	0.00
SG2A	0.00
SG3	0.00

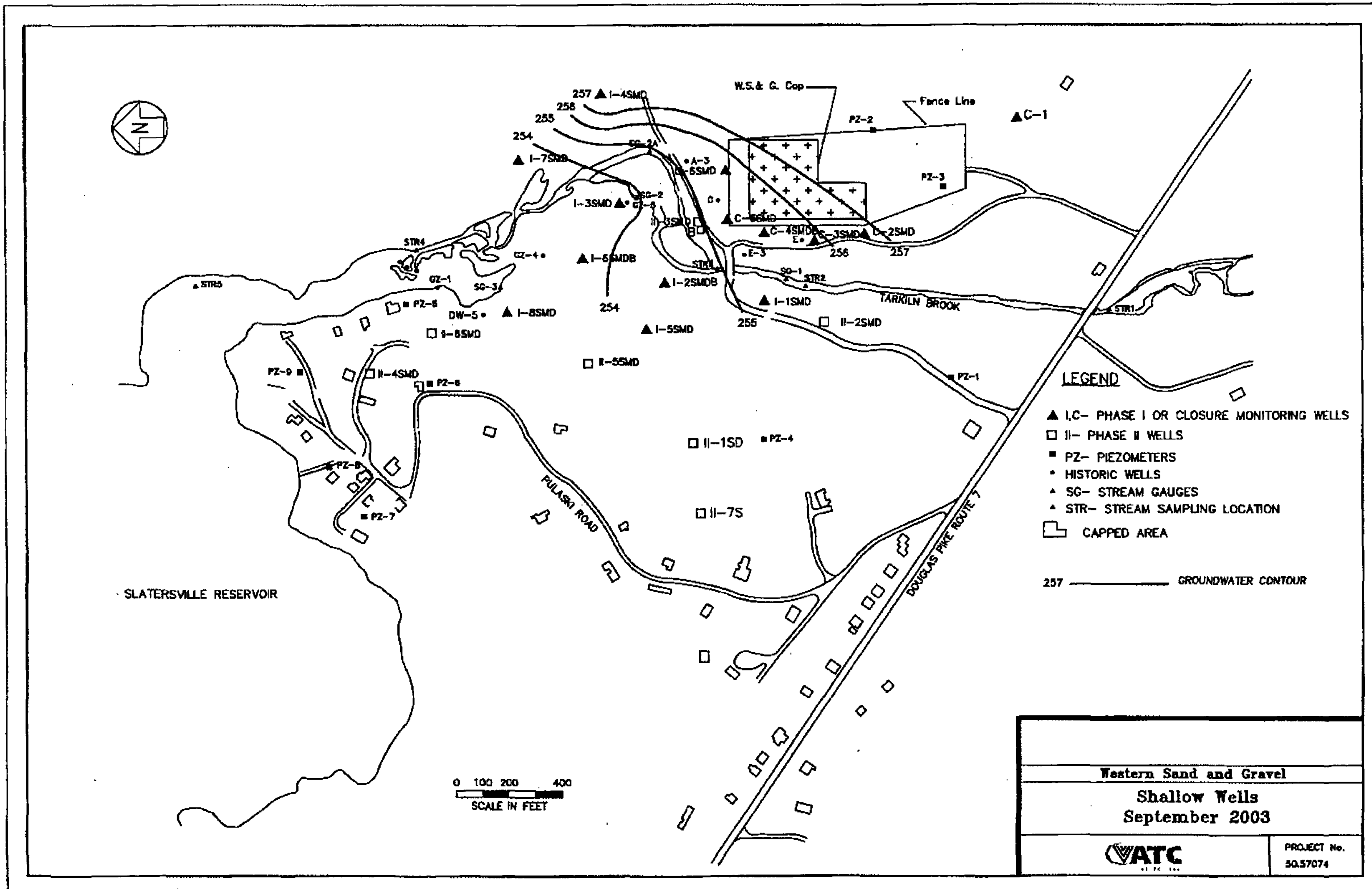
PIEZOMETERS

PZ1	
PZ2	0.00
PZ3	0.00
PZ4	
PZ5	
PZ6	
PZ7	
PZ8	
PZ9	

HISTORIC WELLS

E	
E-3	
C	
A-3	
GZ-5	
GZ-4	
DW-5	0.00
GZ-1	

: Wells temporarily sealed in 2001 in accordance with 8/7/01 EPA letter.
All elevations reference mean sea level.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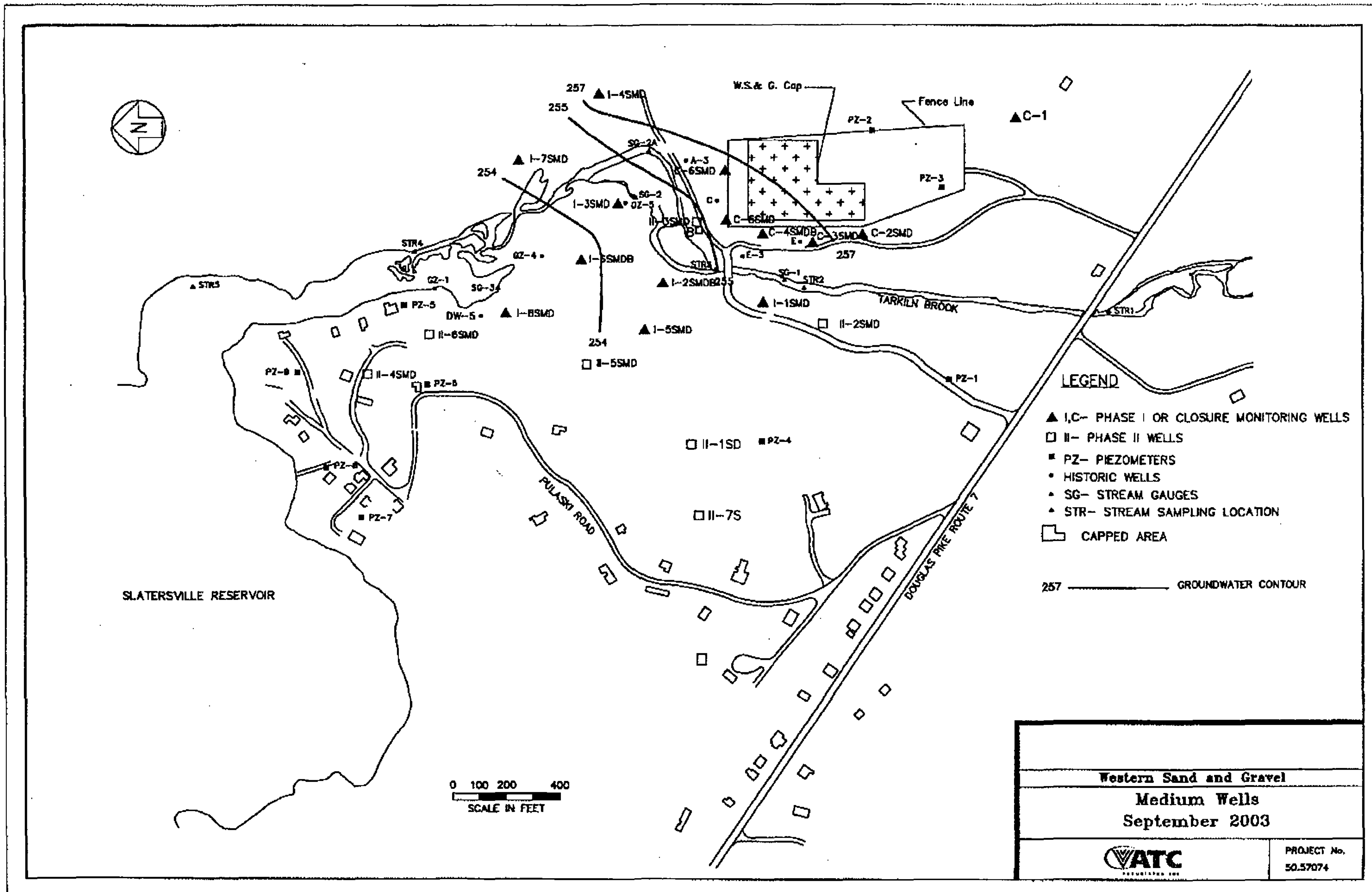
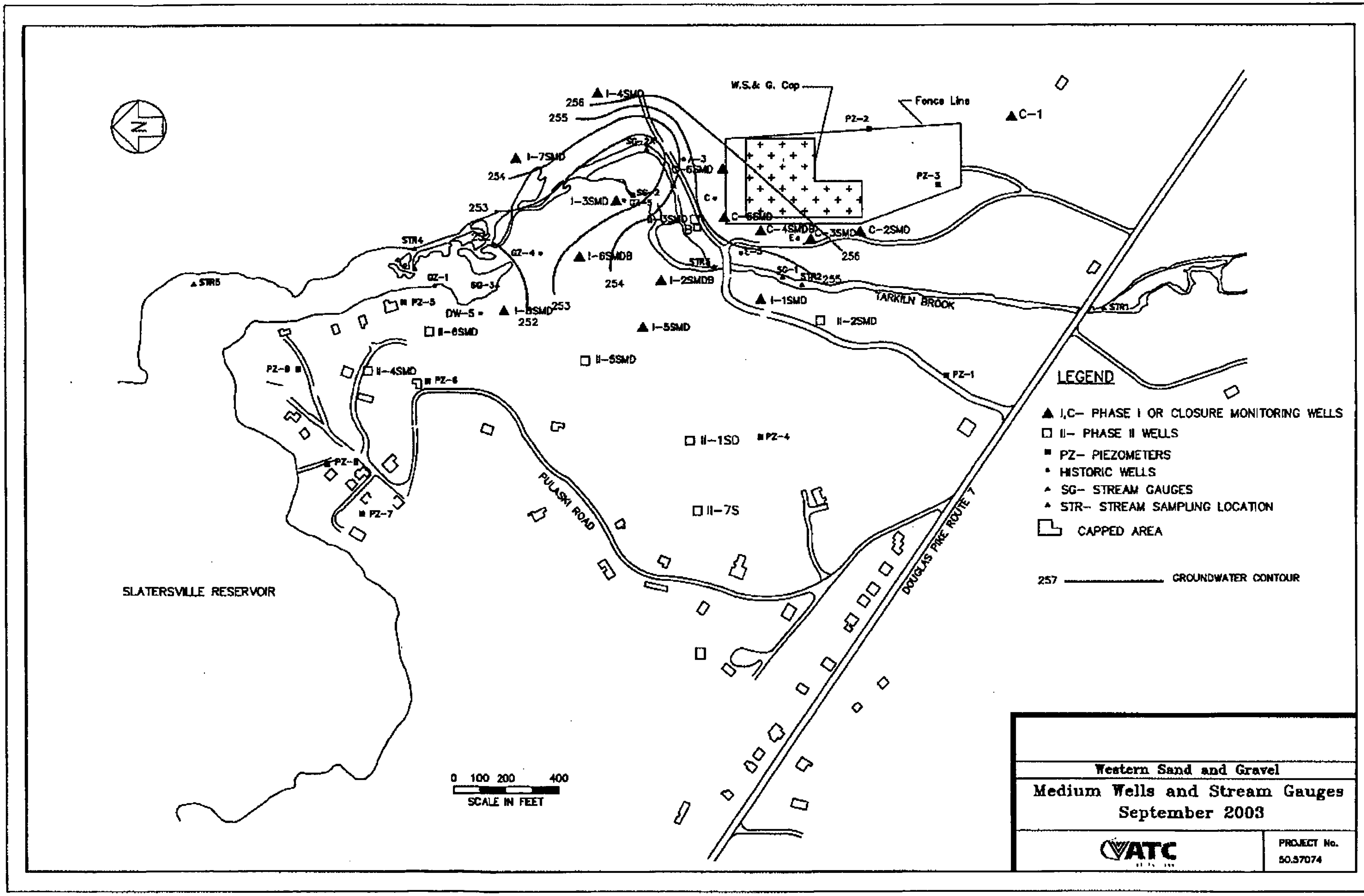
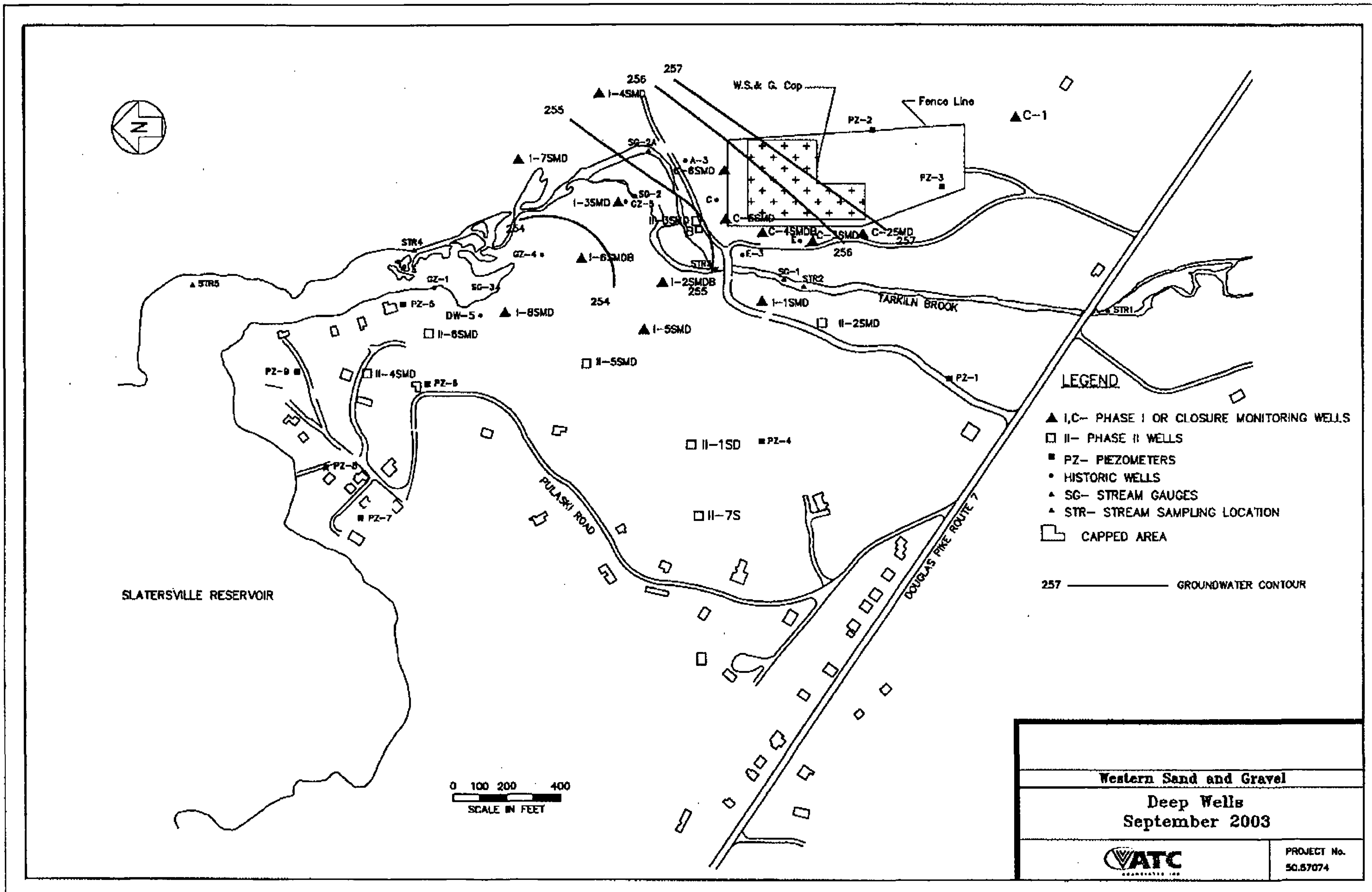
Fence Line
PZ-2
PZ-3
C-1
I-4SMD
I-7SMD
I-3SMD
I-6SMDB
I-2SMDB
I-1SMD
I-5SMD
I-8SMD
II-8SMD
II-5SMD
II-4SMD
II-2SMD
II-1SD
II-7S
C-5SMD
C-4SMDB
C-3SMD
C-2SMD
PZ-1
PZ-4
PZ-5
PZ-6
PZ-7
PZ-8
PZ-9
DW-5
GZ-1
GZ-4
SG-1
SG-2
SG-3
STR1
STR2
STR4
STR5
TARKILN BROOK
PULASKI ROAD
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
257 GROUNDWATER CONTOUR
0 100 200 400
SCALE IN FEET
Western Sand and Gravel
Shallow Wells
September 2003
ATC
PROJECT No.
50.57074

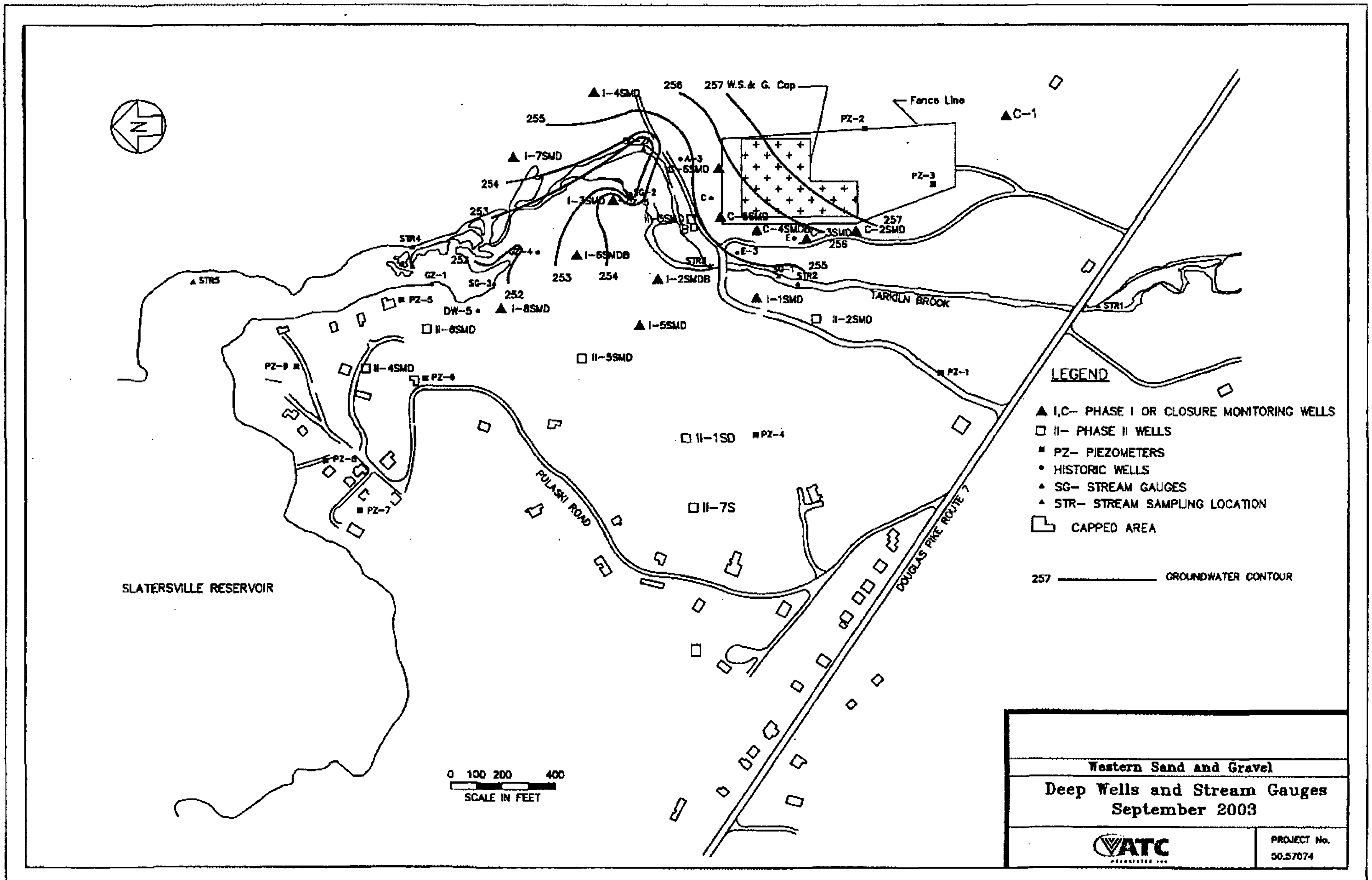

W.S.& G. Cap
Fence Line
C-1
PZ-2
PZ-3
257
I-4SMD
255
254
I-7SMD
SG-2A
A-3
C-6SMD
I-3SMD
SG-2
GZ-5
C-5SMD
II-3SMD
C-4SMDB
C-3SMD
C-2SMD
E-3
STR3
STR4
STR5
GZ-4
I-6SMDB
I-2SMDB
SG-1
STR2
GZ-1
SG-3
PZ-5
DW-5
I-8SMD
I-1SMD
II-2SMD
TARKILN BROOK
STR1
II-6SMD
I-5SMD
II-5SMD
PZ-1
PZ-9
II-4SMD
PZ-6
II-1SD
PZ-4
PZ-8
PZ-7
II-7S
PULASKI ROAD
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
0 100 200 400
SCALE IN FEET
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
257 GROUNDWATER CONTOUR
Western Sand and Gravel
Medium Wells
September 2003
ATC
PROJECT No.
50.57074



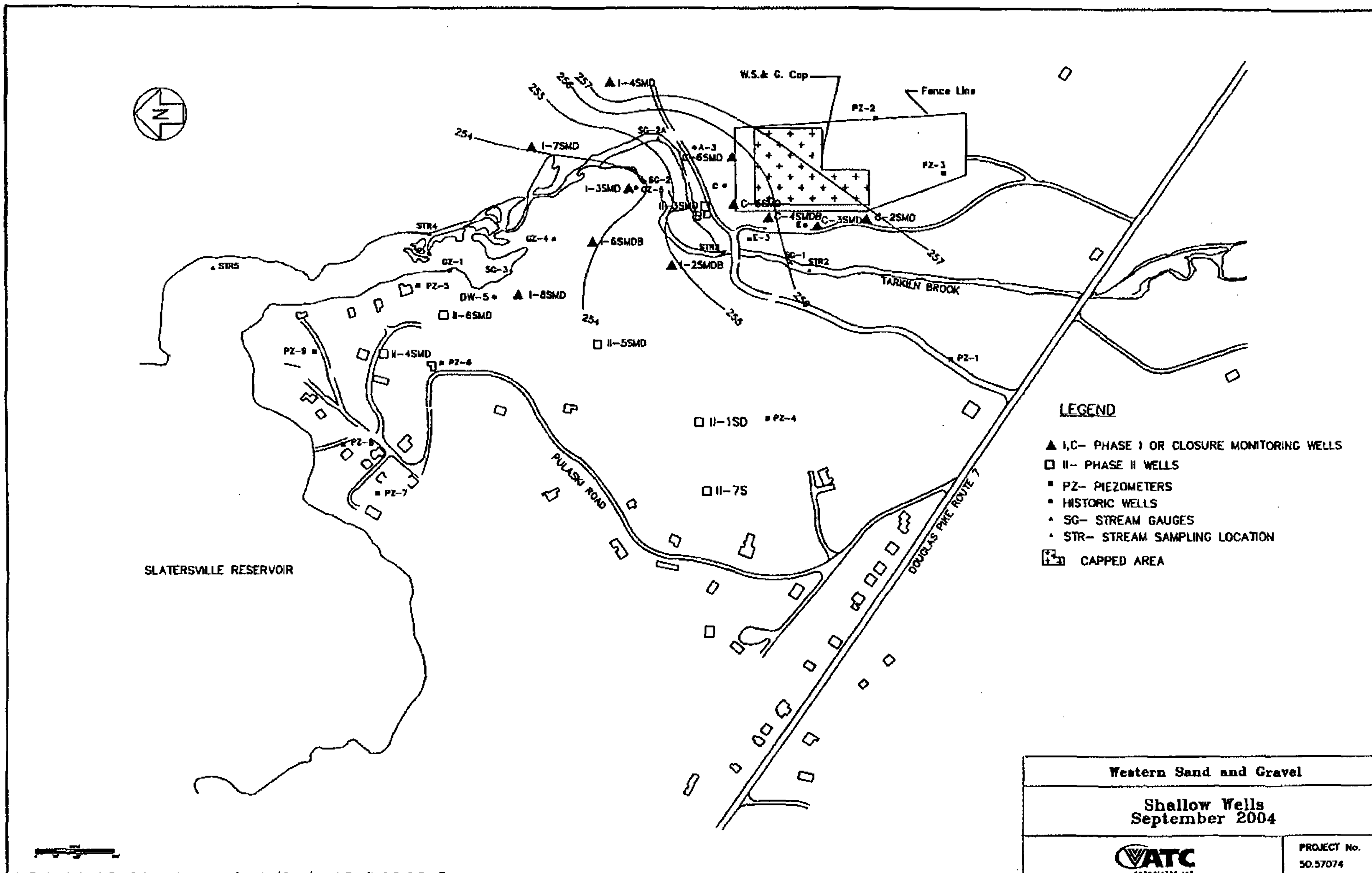
W.S.& G. Cap
Fence Line
C-1
PZ-2
PZ-3
I-4SMD
256
255
254
253
252
I-7SMD
I-3SMD
I-6SMDB
I-2SMDB
I-1SMD
I-5SMD
I-8SMD
II-2SMD
II-6SMD
II-5SMD
II-4SMD
II-1SD
II-7S
C-6SMD
C-4SMDB
C-3SMD
C-2SMD
STR4
STR5
STR1
STR2
STR3
SG-1
SG-2
SG-3
GZ-1
GZ-4
DW-5
PZ-1
PZ-4
PZ-5
PZ-6
PZ-7
PZ-8
PZ-9
TARKILN BROOK
PULASKI ROAD
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
257 GROUNDWATER CONTOUR
0 100 200 400
SCALE IN FEET
Western Sand and Gravel
Medium Wells and Stream Gauges
September 2003
ATC
PROJECT No.
50.37074



N
257
256
255
254
255
256
257
W.S.& G. Cap
Fence Line
PZ-2
PZ-3
C-1
I-4SMD
I-7SMD
SG-2A
A-3
C-6SMD
C
I-3SMD
SG-2
GZ-5
II-3SMD
C-5SMD
C-4SMDB
C-3SMD
C-2SMD
E-3
SG-1
STR2
STR3
STR4
STR5
STR1
TARKILN BROOK
GZ-4
I-6SMDB
I-2SMDB
I-1SMD
II-2SMD
GZ-1
SG-3
PZ-6
DW-5
I-8SMD
I-5SMD
II-6SMD
II-5SMD
PZ-9
II-4SMD
PZ-5
PZ-1
II-1SD
PZ-4
PZ-8
PZ-7
II-7S
PULASKI ROAD
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
0 100 200 400
SCALE IN FEET
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
257 GROUNDWATER CONTOUR
Western Sand and Gravel
Deep Wells
September 2003
ATC
PROJECT No.
50.57074



SLATERSVILLE RESERVOIR
PULASKI ROAD
DOUGLAS PIKE ROUTE 7
TARKILN BROOK
Fence Line
257 W.S.& G. Cap
I-4SMD
I-7SMD
I-3SMD
I-6SMDB
I-2SMDB
I-1SMD
I-5SMD
I-8SMD
C-1
C-5SMD
C-4SMDB
C-3SMD
C-2SMD
PZ-1
PZ-2
PZ-3
PZ-4
PZ-5
PZ-6
PZ-7
PZ-8
PZ-9
II-1SD
II-2SMD
II-4SMD
II-5SMD
II-6SMD
II-7S
DW-5
STR1
STR2
STR3
STR4
STR5
SG-1
SG-2
SG-3
GZ-1
LEGEND
I,C– PHASE I OR CLOSURE MONITORING WELLS
II– PHASE II WELLS
PZ– PIEZOMETERS
HISTORIC WELLS
SG– STREAM GAUGES
STR– STREAM SAMPLING LOCATION
CAPPED AREA
257 GROUNDWATER CONTOUR
0 100 200 400
SCALE IN FEET
Western Sand and Gravel
Deep Wells and Stream Gauges
September 2003
ATC
PROJECT No.
50.57074



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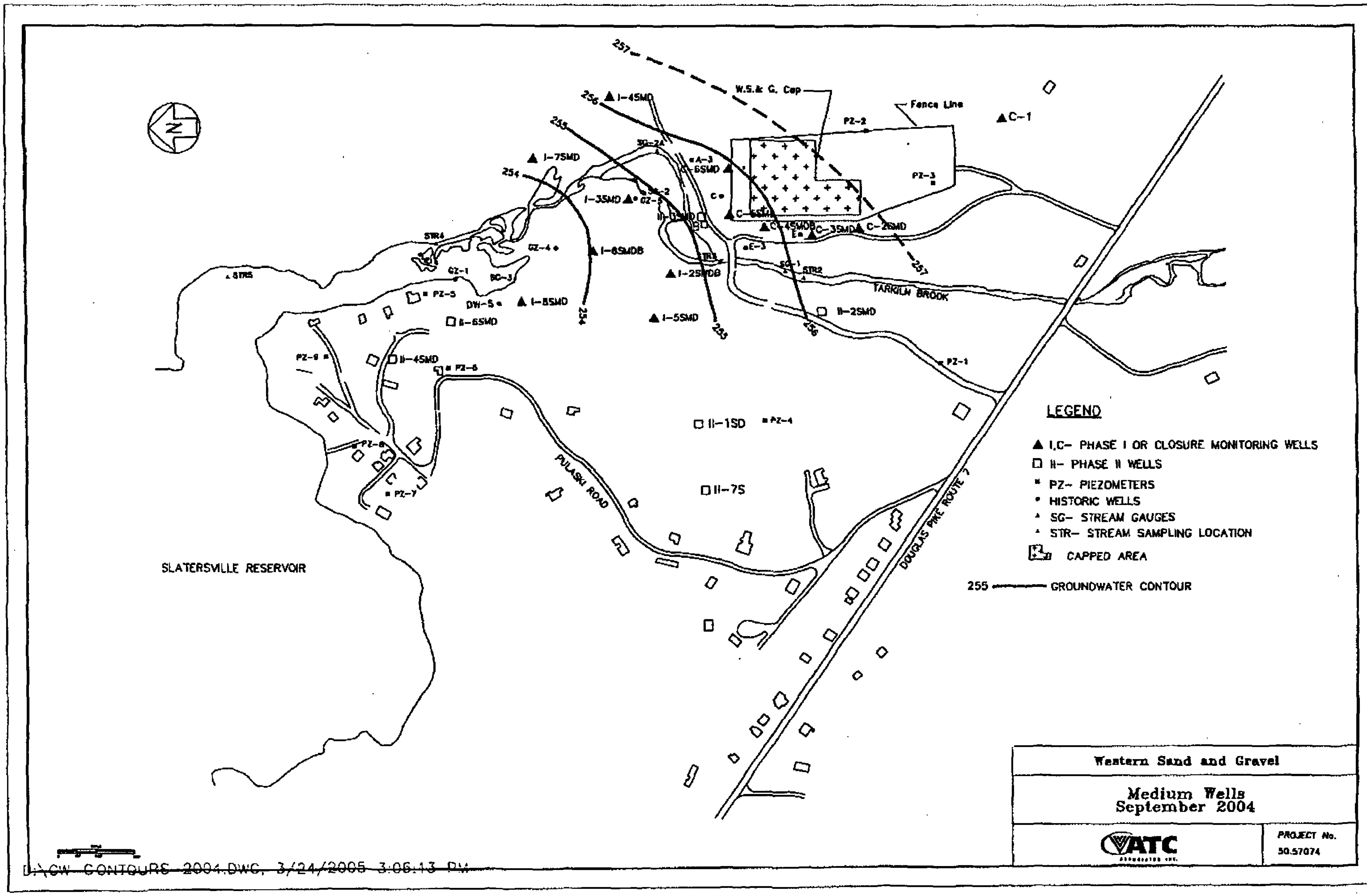
W.S.& G. Cap
Fence Line
257
256
255
254
I-45MD
I-7SMD
I-3SMD
I-6SMDB
I-2SMDB
I-8SMD
I-5SMD
C-1
C-6SMD
C-5SMD
C-4SMDB
C-3SMD
C-2SMD
PZ-1
PZ-2
PZ-3
PZ-4
PZ-5
PZ-6
PZ-7
PZ-8
PZ-9
II-1SD
II-2SMD
II-4SMD
II-6SMD
II-7S
DW-5
GZ-1
GZ-4
SG-1
SG-2A
SG-3
STR2
STR3
STR4
STR5
A-3
E-3
TARKILN BROOK
PULASKI ROAD
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
255 GROUNDWATER CONTOUR
Western Sand and Gravel
Medium Wells
September 2004
ATC
PROJECT No.
50.57074
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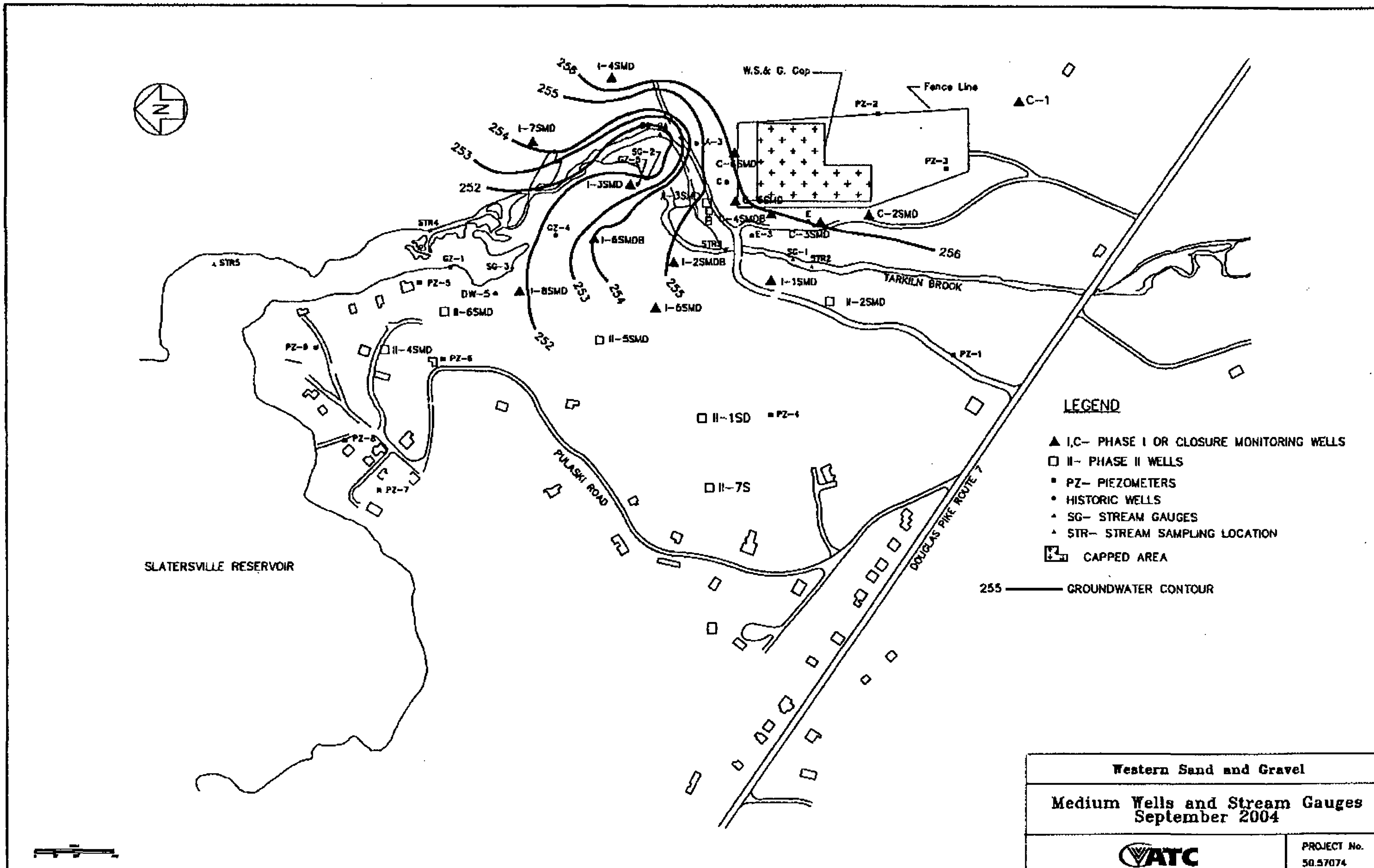

Western Sand and Gravel

Medium Wells and Stream Gauges
September 2004

ATC

PROJECT No.
50.57074

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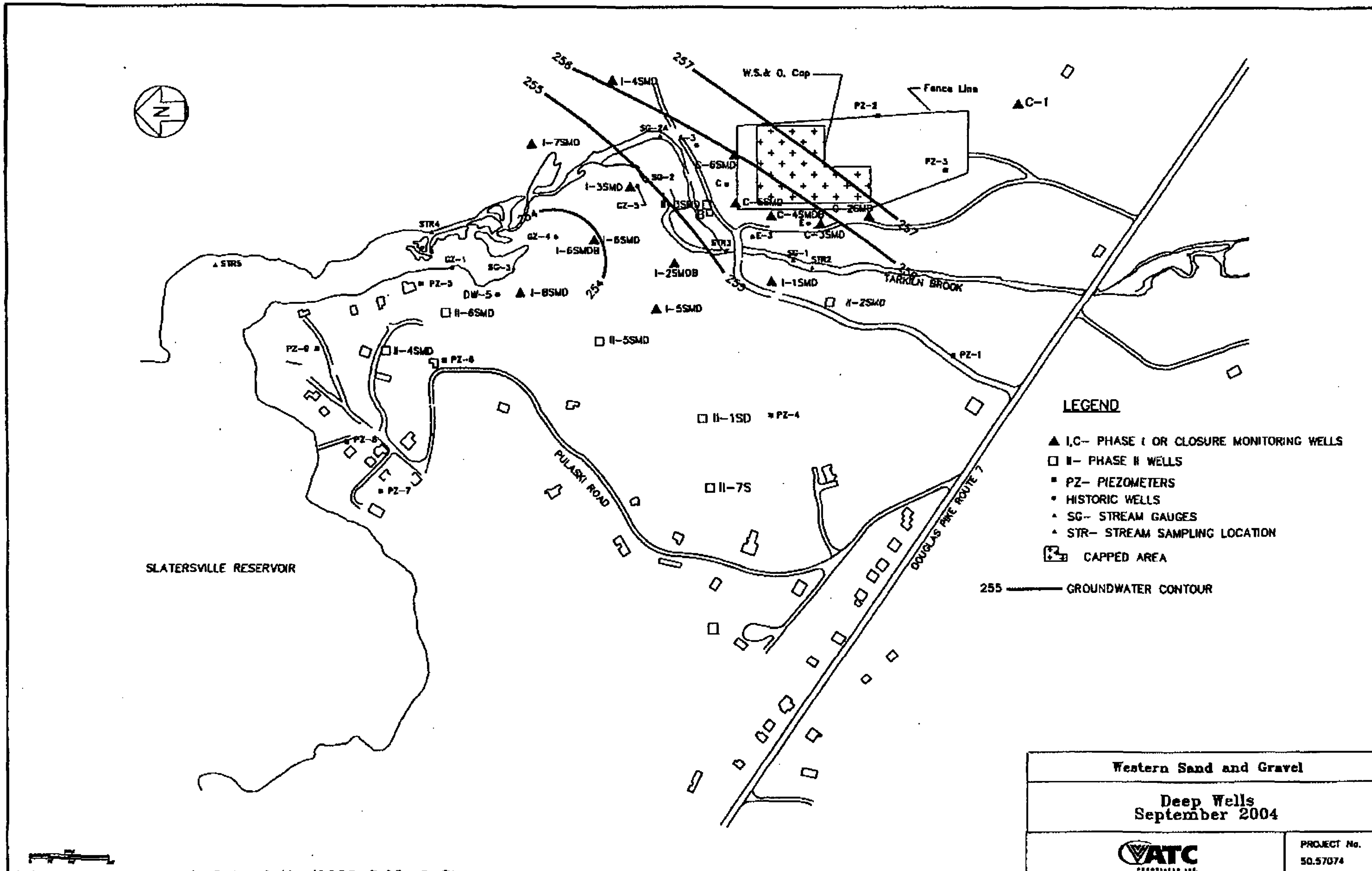

Western Sand and Gravel

Deep Wells
September 2004

ATC

PROJECT No.
50.57074

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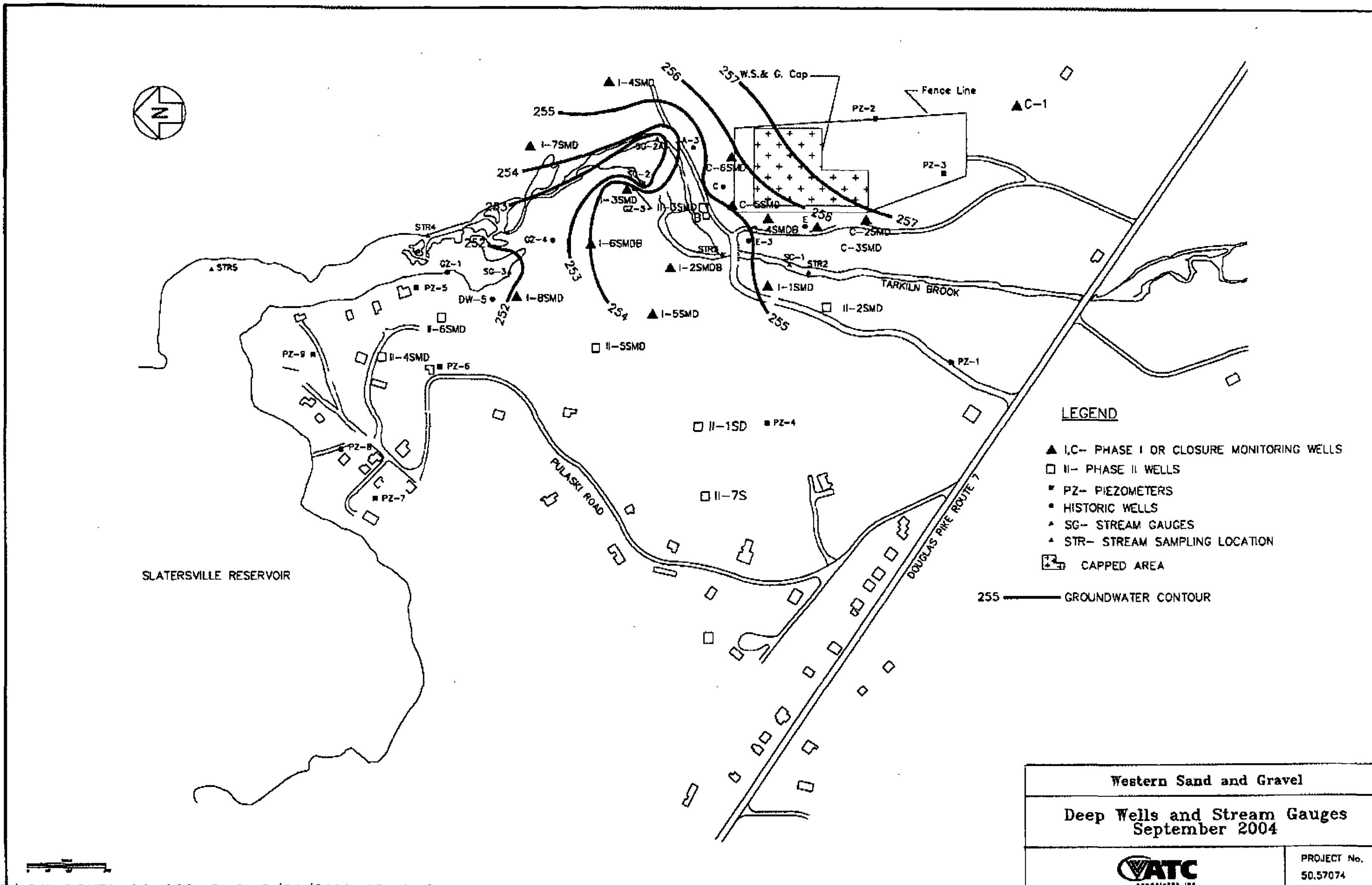

Western Sand and Gravel

Deep Wells and Stream Gauges
September 2004

PROJECT No.
50.57074

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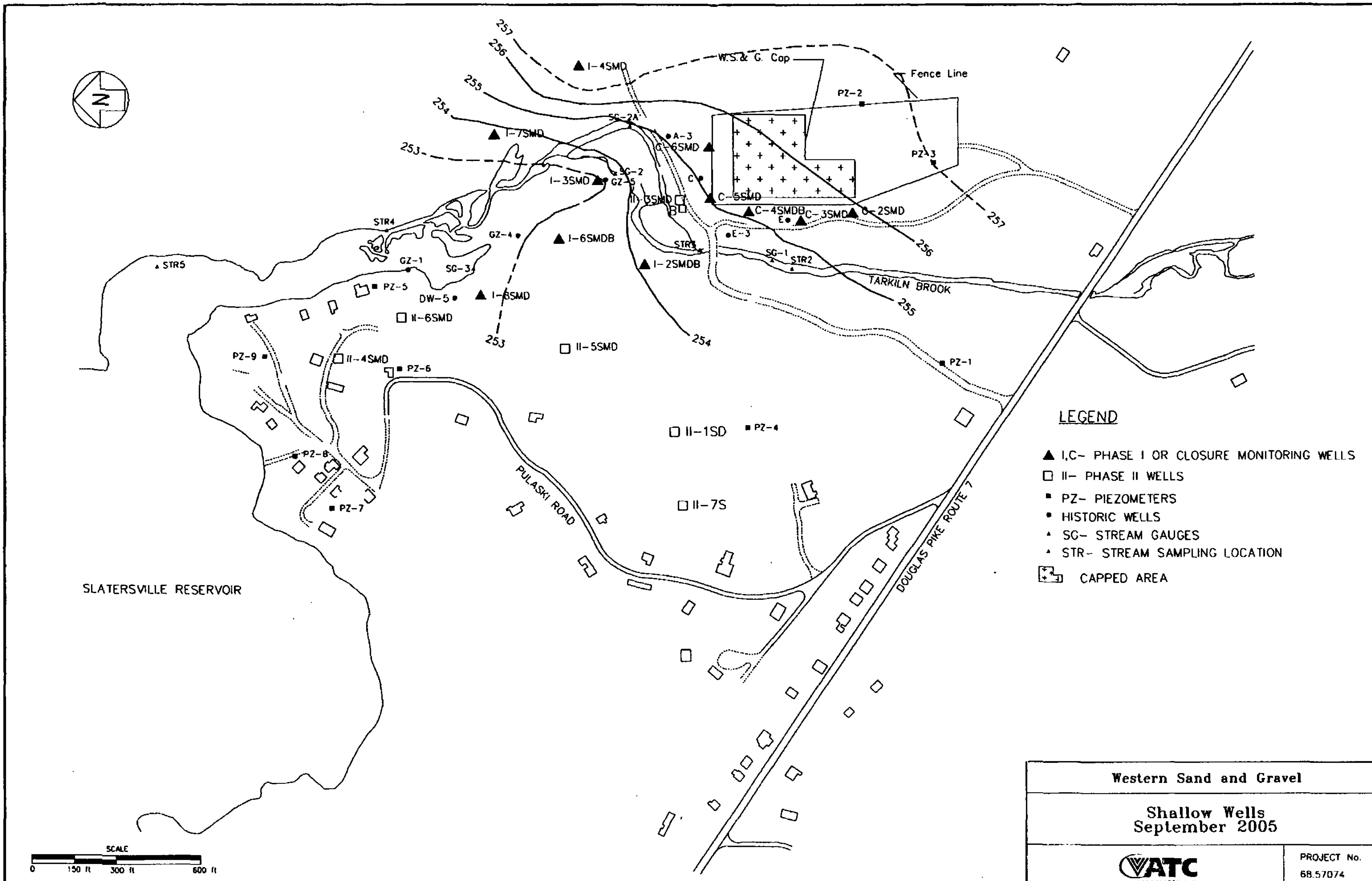
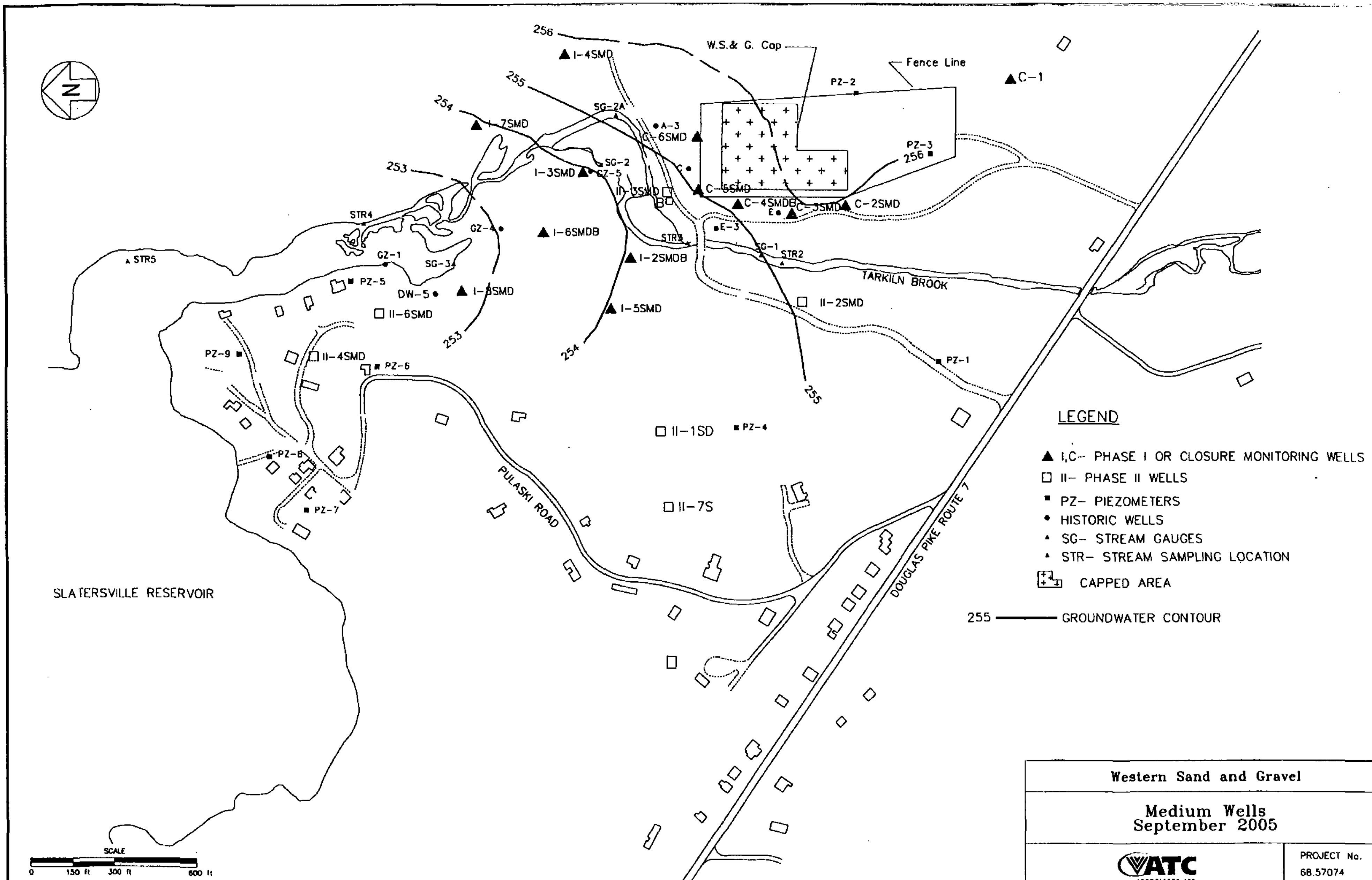


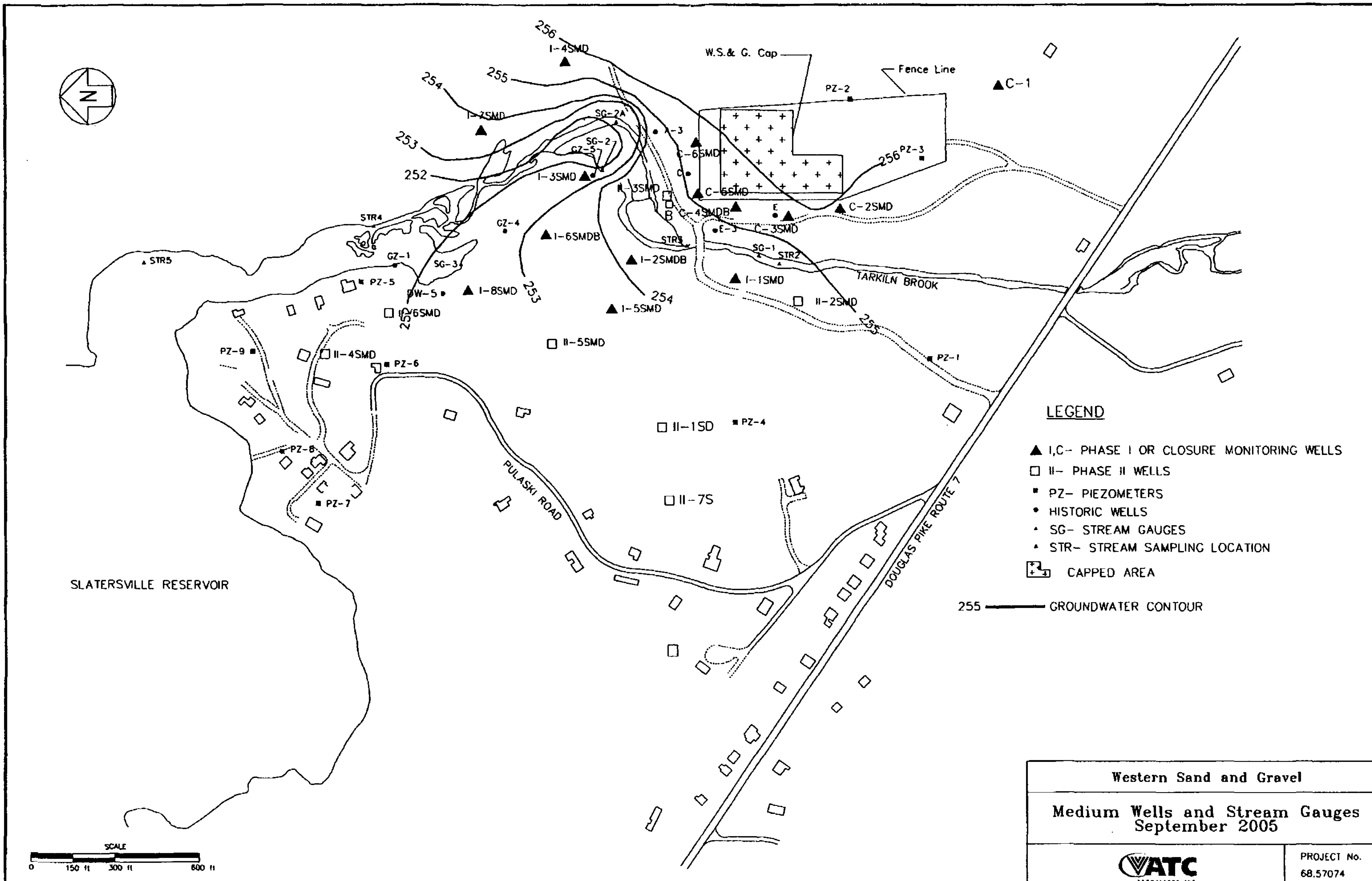
Western Sand and Gravel

Shallow Wells
September 2005

PROJECT No.
68.57074



Western Sand and Gravel	
Medium Wells September 2005	
ATC	PROJECT No. 68.57074

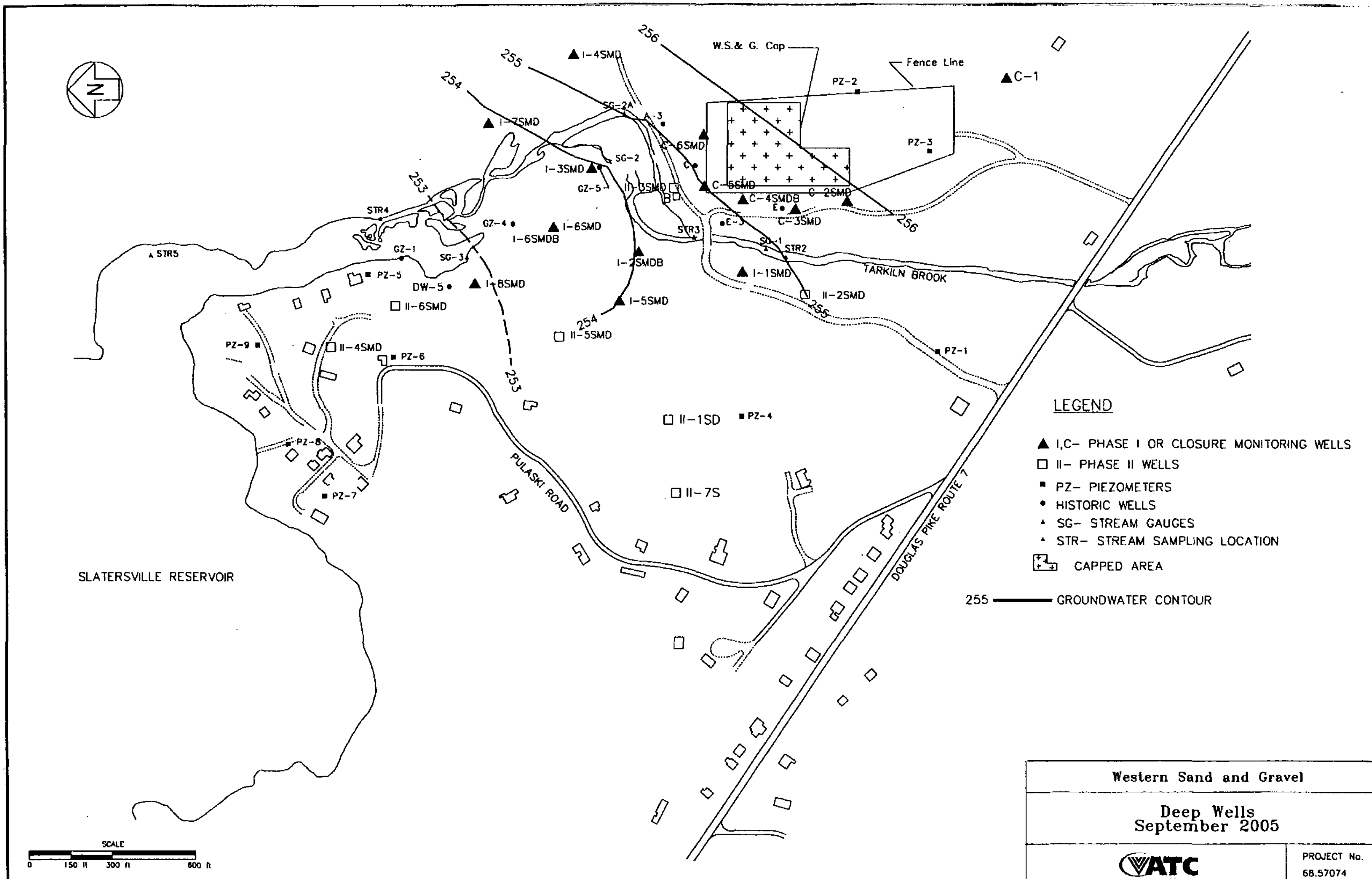


Western Sand and Gravel

Medium Wells and Stream Gauges
September 2005

ATC

PROJECT No.
68.57074

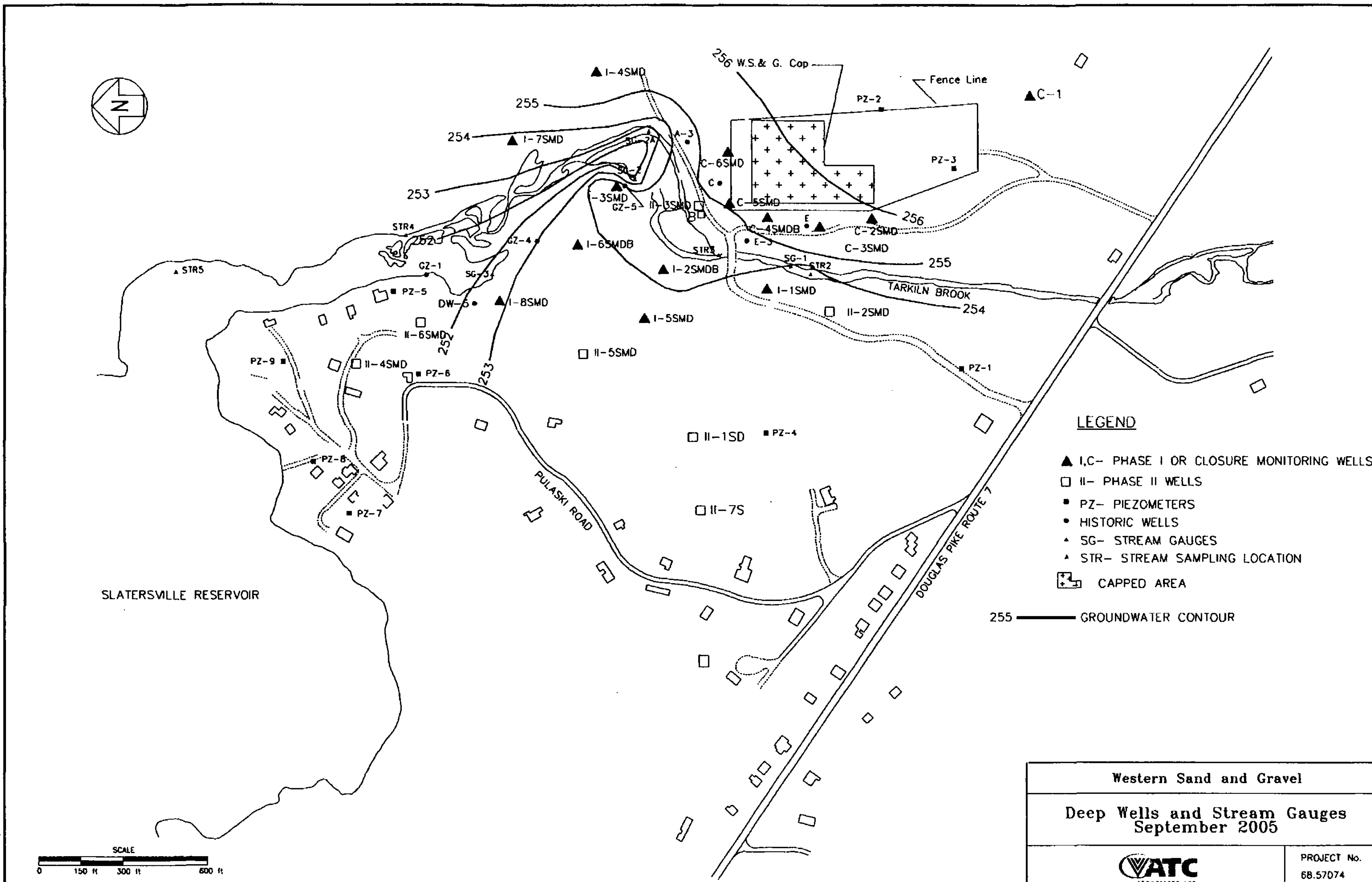


Western Sand and Gravel

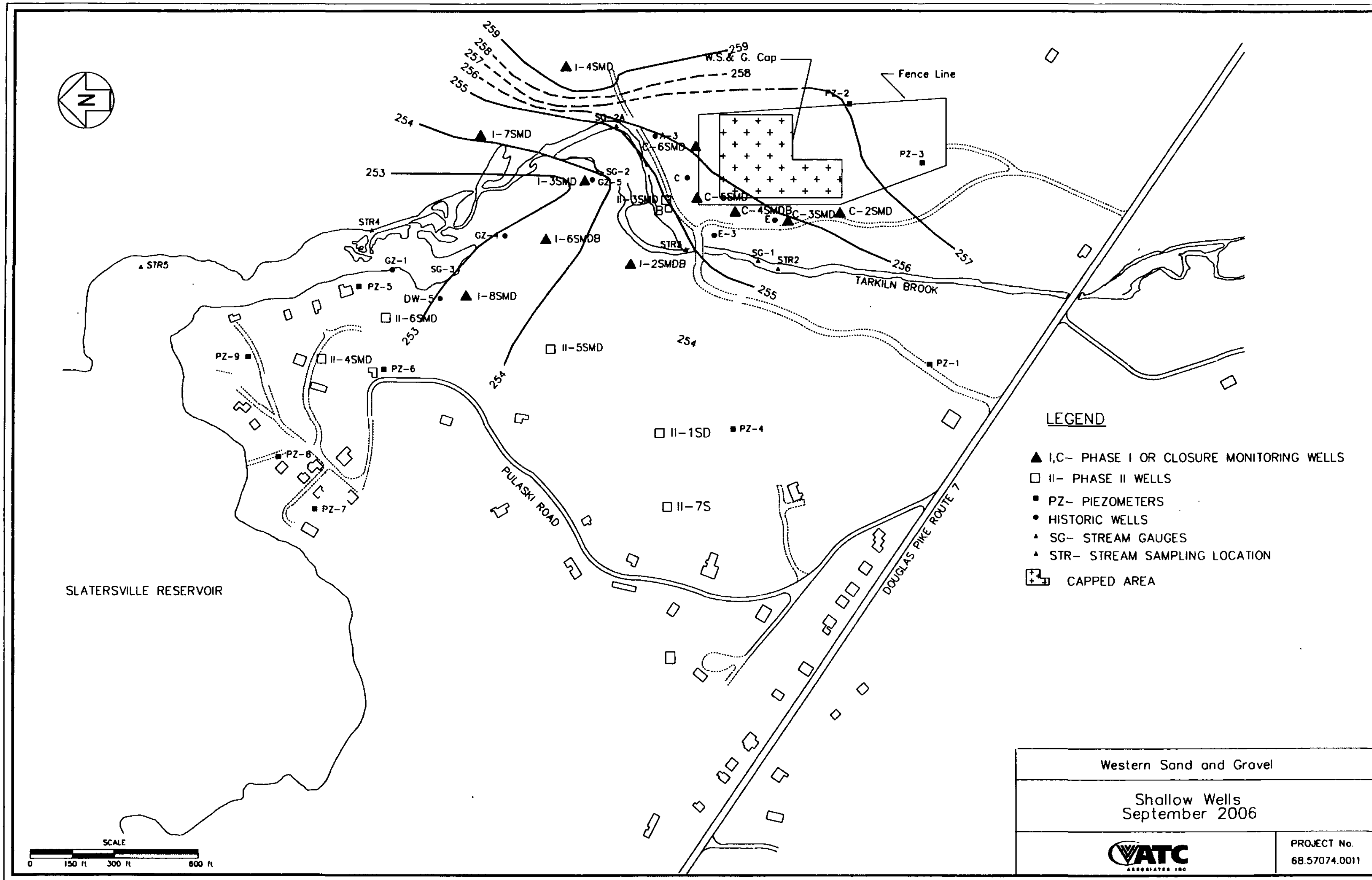
Deep Wells
September 2005

ATC

PROJECT No.
68.57074



N
I-4SMD
W.S.& G. Cop
Fence Line
C-1
PZ-2
PZ-3
255
254
253
252
256
I-7SMD
A-3
C-6SMD
C
C-5SMD
I-3SMD
GZ-5
II-3SMD
STR4
GZ-4
I-6SMDB
C-4SMDB
E
C-2SMD
E-3
C-3SMD
STR3
I-2SMDB
SG-1
STR2
TARKILN BROOK
STR5
GZ-1
SG-3
PZ-5
DW-6
I-8SMD
I-1SMD
I-5SMD
II-2SMD
II-6SMD
II-5SMD
PZ-9
II-4SMD
PZ-6
PZ-1
II-1SD
PZ-4
PZ-8
PZ-7
PULASKI ROAD
II-7S
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
255 GROUNDWATER CONTOUR
SCALE
0 150 ft 300 ft 600 ft
Western Sand and Gravel
Deep Wells and Stream Gauges
September 2005
ATC
PROJECT No.
68.57074



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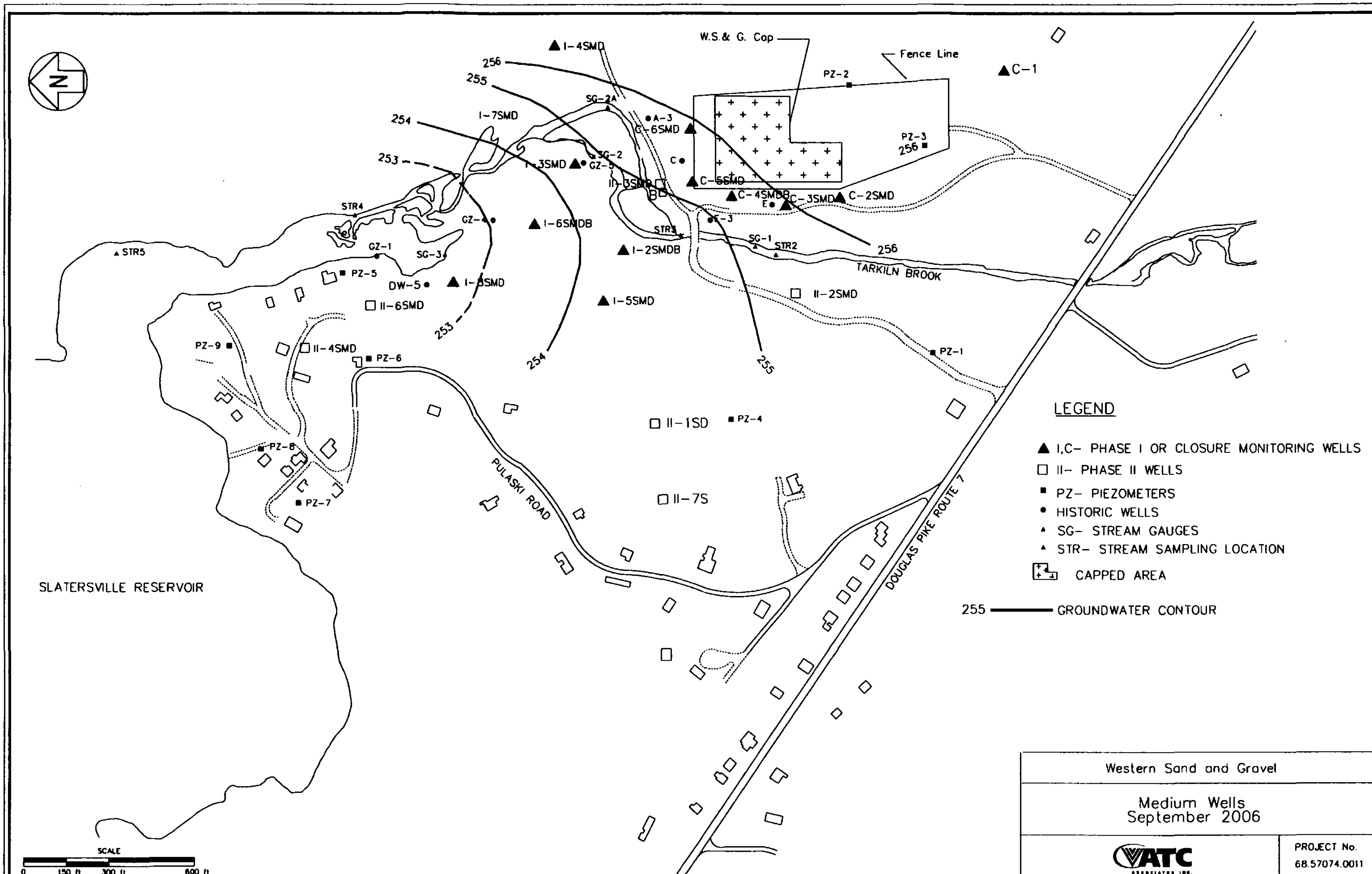

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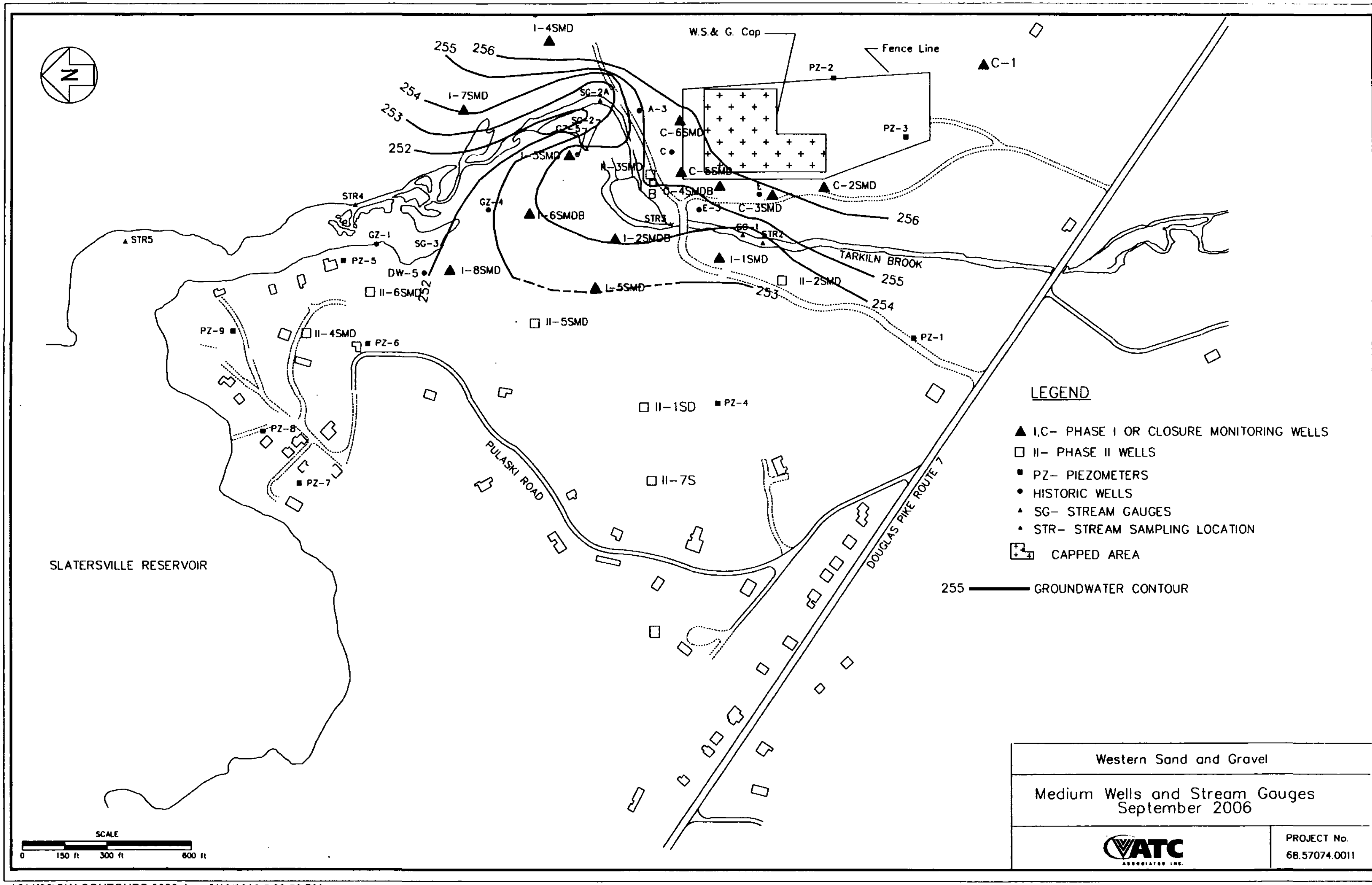
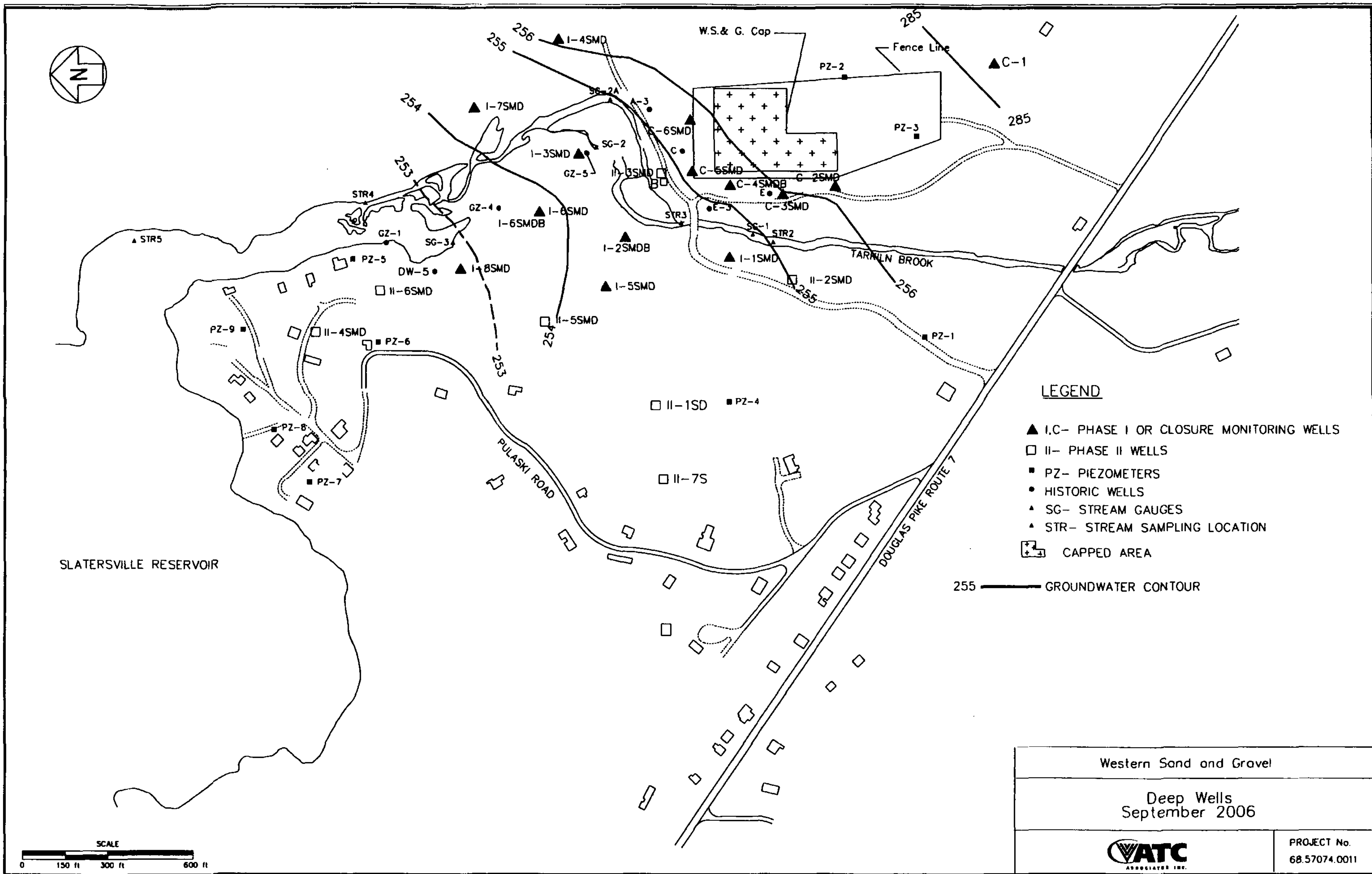

I-4SMD
W.S.& G. Cap
Fence Line
PZ-2
C-1
I-7SMD
SG-2A
A-3
C-6SMD
PZ-3
I-3SMD
C-5SMD
C-4SMDB
C-2SMD
C-3SMD
STR4
GZ-4
I-6SMDB
STR5
GZ-1
SG-3
I-2SMDB
SG-1
STR2
TARKILN BROOK
I-1SMD
PZ-5
DW-5
I-8SMD
I-5SMD
II-2SMD
II-6SMD
II-5SMD
PZ-1
PZ-9
II-4SMD
PZ-6
II-1SD
PZ-4
PZ-8
PZ-7
II-7S
PULASKI ROAD
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
252
253
254
255
256
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
255 GROUNDWATER CONTOUR
SCALE
0 150 ft 300 ft 600 ft
Western Sand and Gravel
Medium Wells and Stream Gauges
September 2006
ATC
PROJECT No.
68.57074.0011



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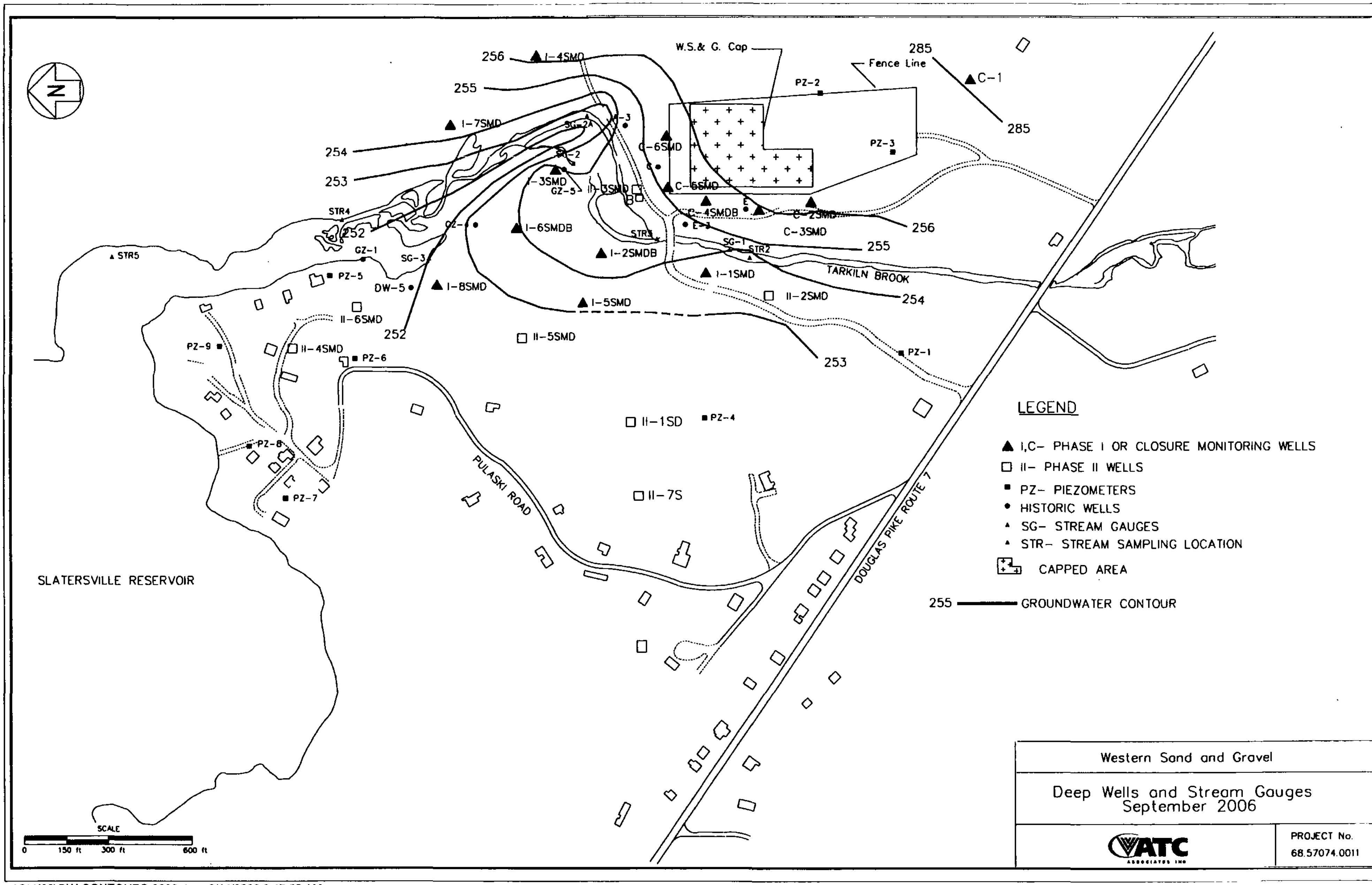

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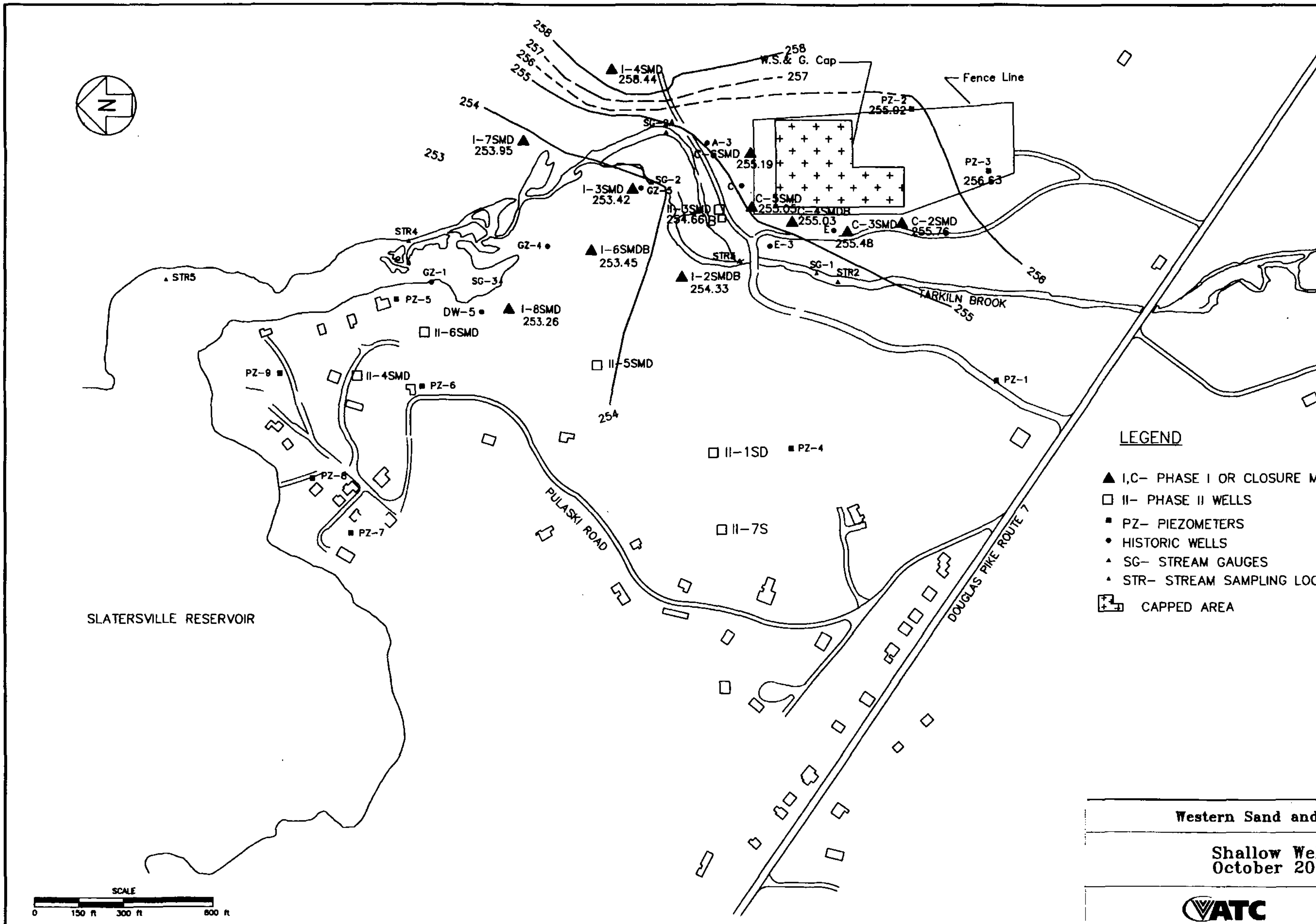
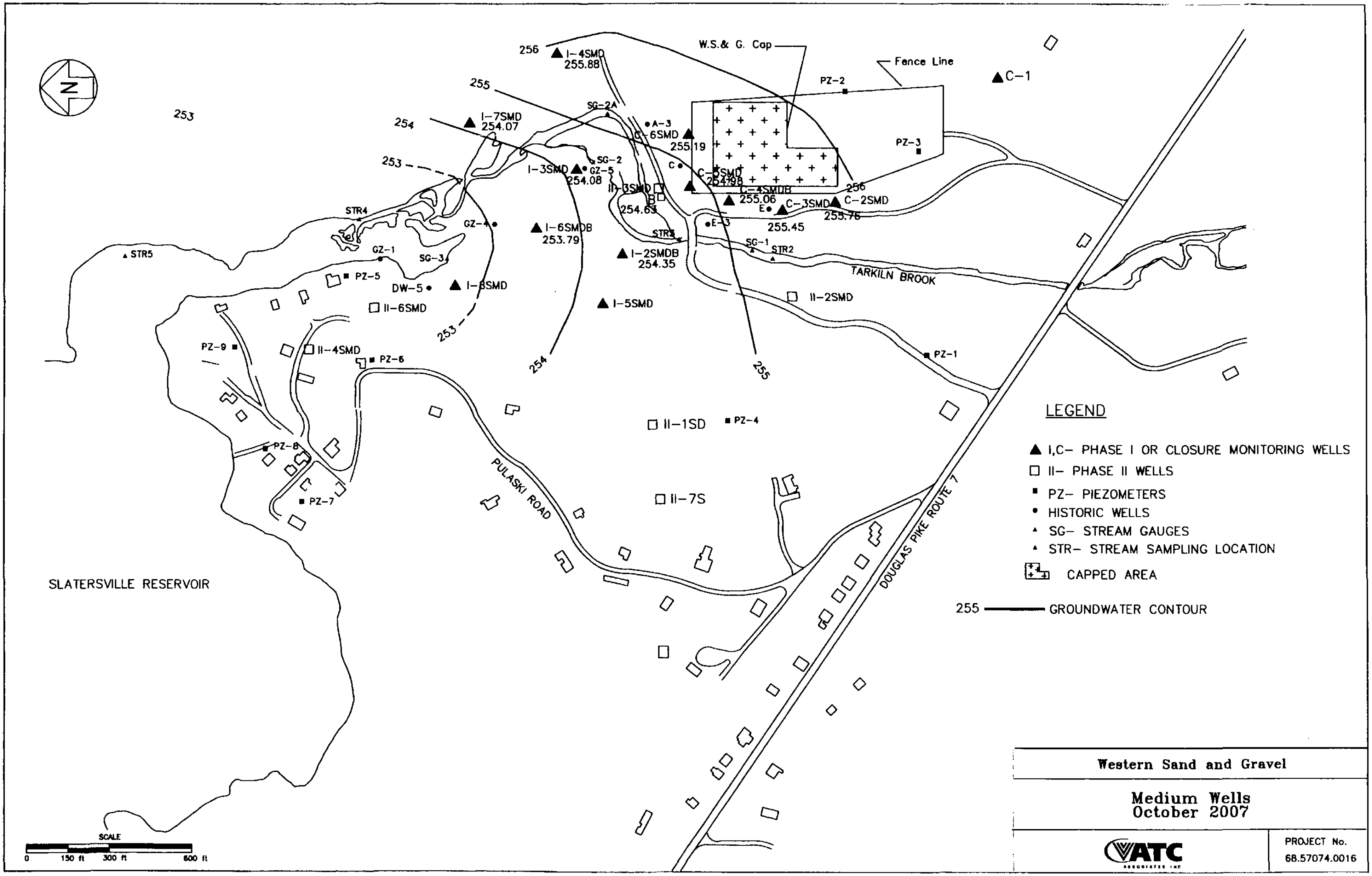


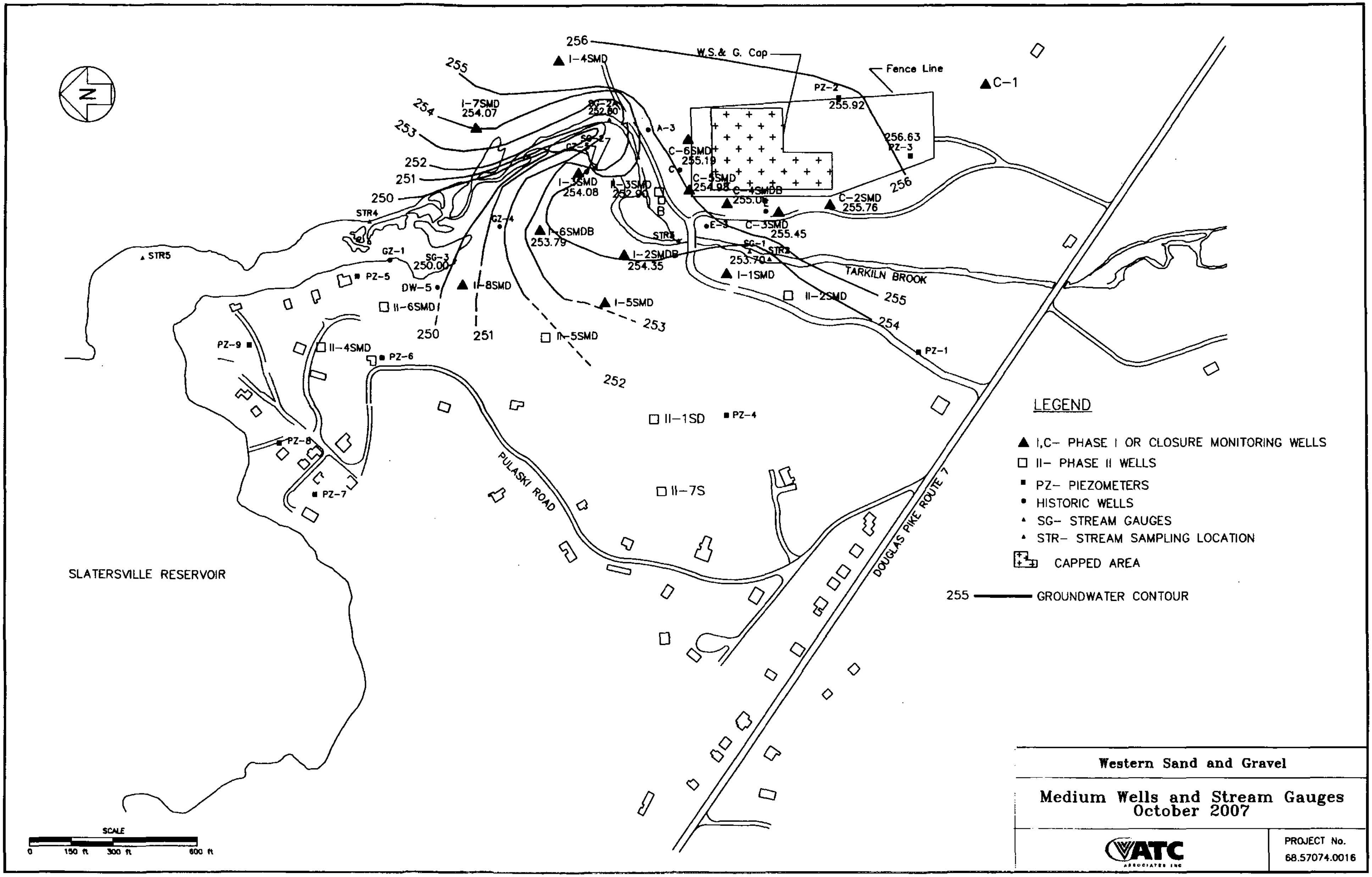
LEGEND

- ▲ I,C– PHASE I OR CLOSURE MONITORING WELLS
- □ II– PHASE II WELLS
- ▪ PZ– PIEZOMETERS
- • HISTORIC WELLS
- ▴ SG– STREAM GAUGES
- ▴ STR– STREAM SAMPLING LOCATION
- CAPPED AREA

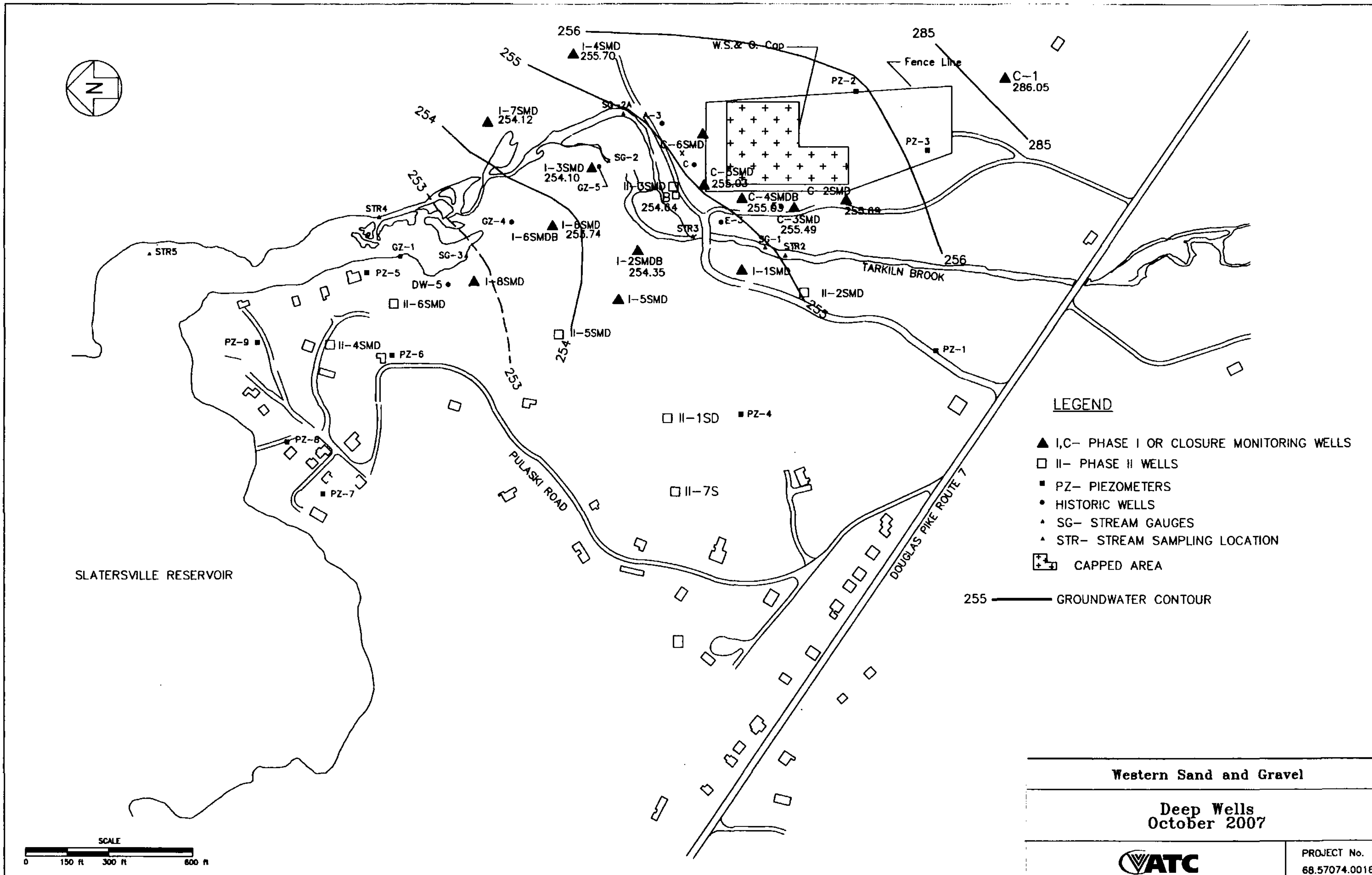
Western Sand and Gravel	
Shallow Wells October 2007	
ATC ASSOCIATES INC	PROJECT No. 68.57074.0016



N
253
254
255
256
I-4SMD
255.88
W.S.& G. Cap
Fence Line
C-1
PZ-2
PZ-3
I-7SMD
254.07
SG-2A
A-3
C-6SMD
255.19
SG-2
I-3SMD
GZ-5
254.08
C
C-5SMD
254.98
C-4SMDB
255.06
II-3SMD
254.63
E
C-3SMD
255.45
C-2SMD
255.76
STR4
GZ-4
I-6SMDB
253.79
E-3
STR3
SG-1
STR2
STR5
GZ-1
SG-3
I-2SMDB
254.35
TARKILN BROOK
PZ-5
DW-5
I-8SMD
II-6SMD
I-5SMD
II-2SMD
PZ-9
II-4SMD
PZ-6
PZ-1
II-1SD
PZ-4
PZ-8
PZ-7
PULASKI ROAD
II-7S
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
255 GROUNDWATER CONTOUR
SCALE
0 150 ft 300 ft 600 ft
Western Sand and Gravel
Medium Wells
October 2007
ATC
PROJECT No.
68.57074.0016



256
255
254
253
252
251
250
W.S.& G. Cap
Fence Line
C-1
I-4SMD
I-7SMD
254.07
SG-2A
252.80
SG-2
GZ-5
A-3
C-6SMD
255.19
C-5SMD
254.98
C-4SMDB
255.06
C-2SMD
255.76
C-3SMD
255.45
PZ-2
255.92
256.63
PZ-3
I-3SMD
254.08
II-3SMD
252.90
STR4
GZ-4
I-6SMDB
253.79
STR3
E-3
SG-1
STR2
253.70
I-1SMD
I-2SMDB
254.35
STR5
GZ-1
SG-3
250.00
PZ-5
DW-5
I-8SMD
II-6SMD
I-5SMD
II-5SMD
II-2SMD
TARKILN BROOK
PZ-1
PZ-9
II-4SMD
PZ-6
II-1SD
PZ-4
PZ-8
PZ-7
II-7S
PULASKI ROAD
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
SCALE
0
150 ft
300 ft
600 ft
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
255 GROUNDWATER CONTOUR
Western Sand and Gravel
Medium Wells and Stream Gauges
October 2007
ATC
PROJECT No.
68.57074.0016

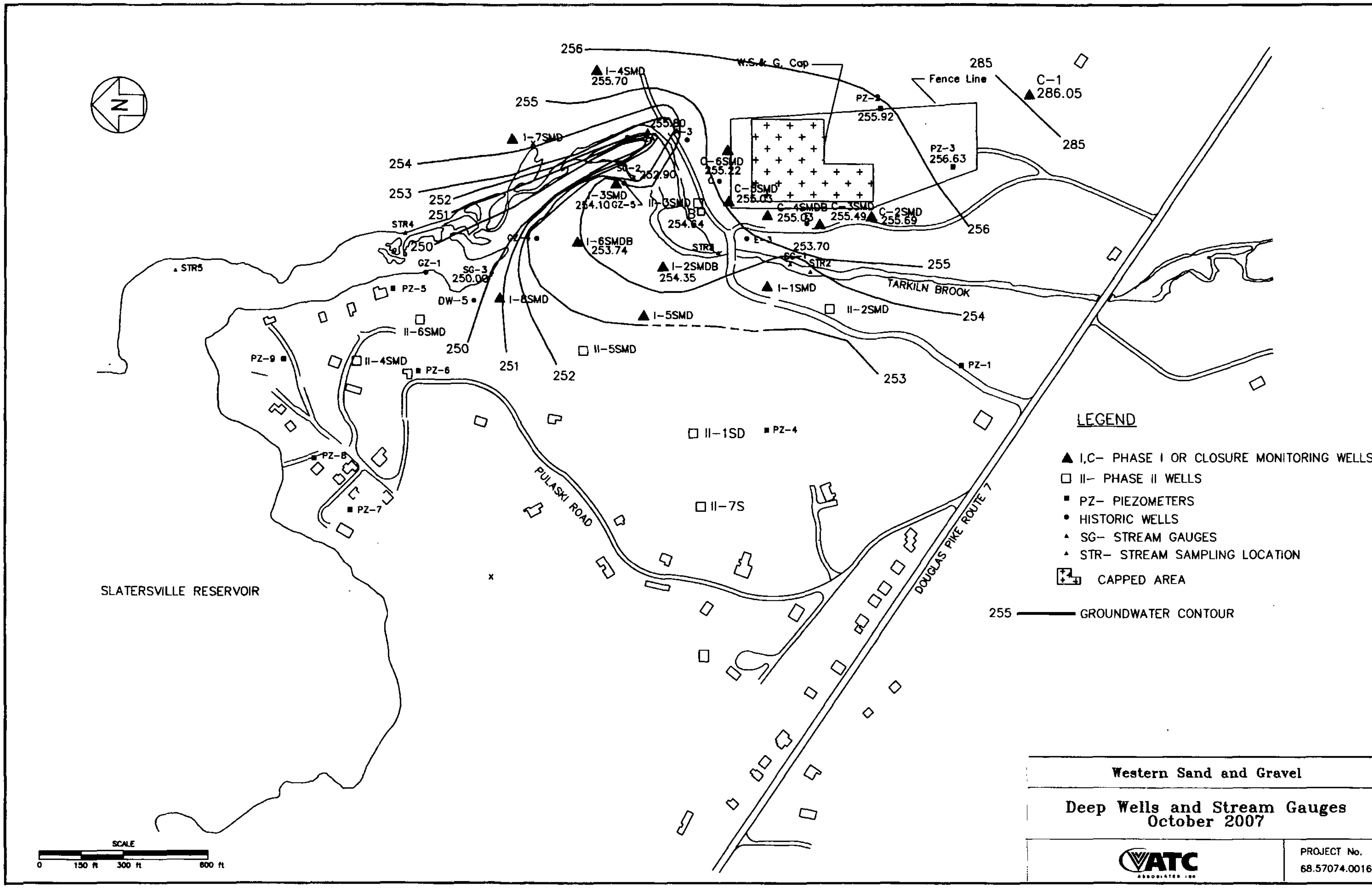


Western Sand and Gravel

Deep Wells October 2007

ATC

PROJECT No. 68.57074.0016

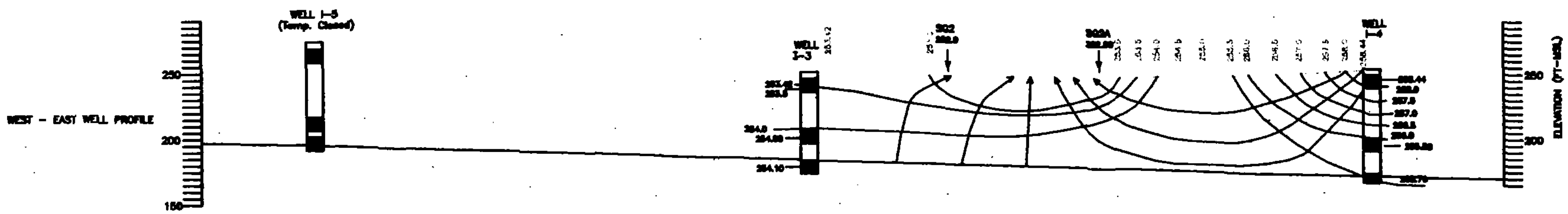


Western Sand and Gravel

Deep Wells and Stream Gauges
October 2007

ATC

PROJECT No.
68.57074.0016



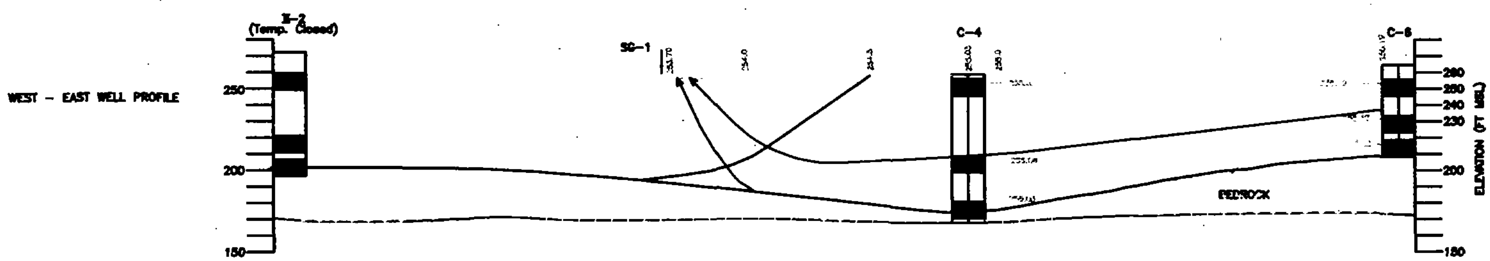
NOTES:

1. WELL SCREEN WIDTHS ARE NOT TO SCALE
2. FLOW LINE TO TAPKEN BROOK INDICATES BANK RECHARGE.
* ELEVATION IS CALCULATED FROM ELEVATION BETWEEN SG-1 AND SG-2

LEGEND

254.5 GROUNDWATER EQUIPOTENTIAL CONTOURS
254.13 GROUNDWATER PIEZOMETRIC LEVELS
GROUNDWATER FLOW DIRECTIONS

FIGURE 3A
OCTOBER 2007



NOTES:

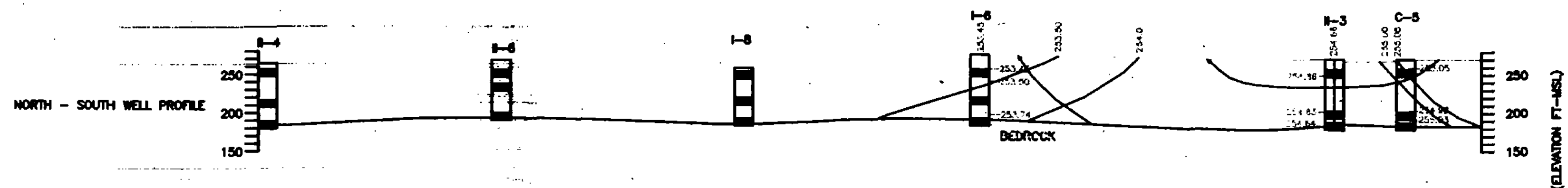
1. WELL SCREEN WIDTHS ARE NOT TO SCALE.
2. FLOW LINE TO BROKEN BROCK INDICATES BANK RECHARGE.

* MEASUREMENTS CALCULATED FROM ELEVATION BETWEEN SG-1 AND SG-2

LEGEND

254.5 GROUNDWATER EQUIPOTENTIAL CONTOURS
254.15 GROUNDWATER PIEZOMETRIC LEVELS
GROUNDWATER FLOW DIRECTIONS

FIGURE 3C
OCTOBER 2007



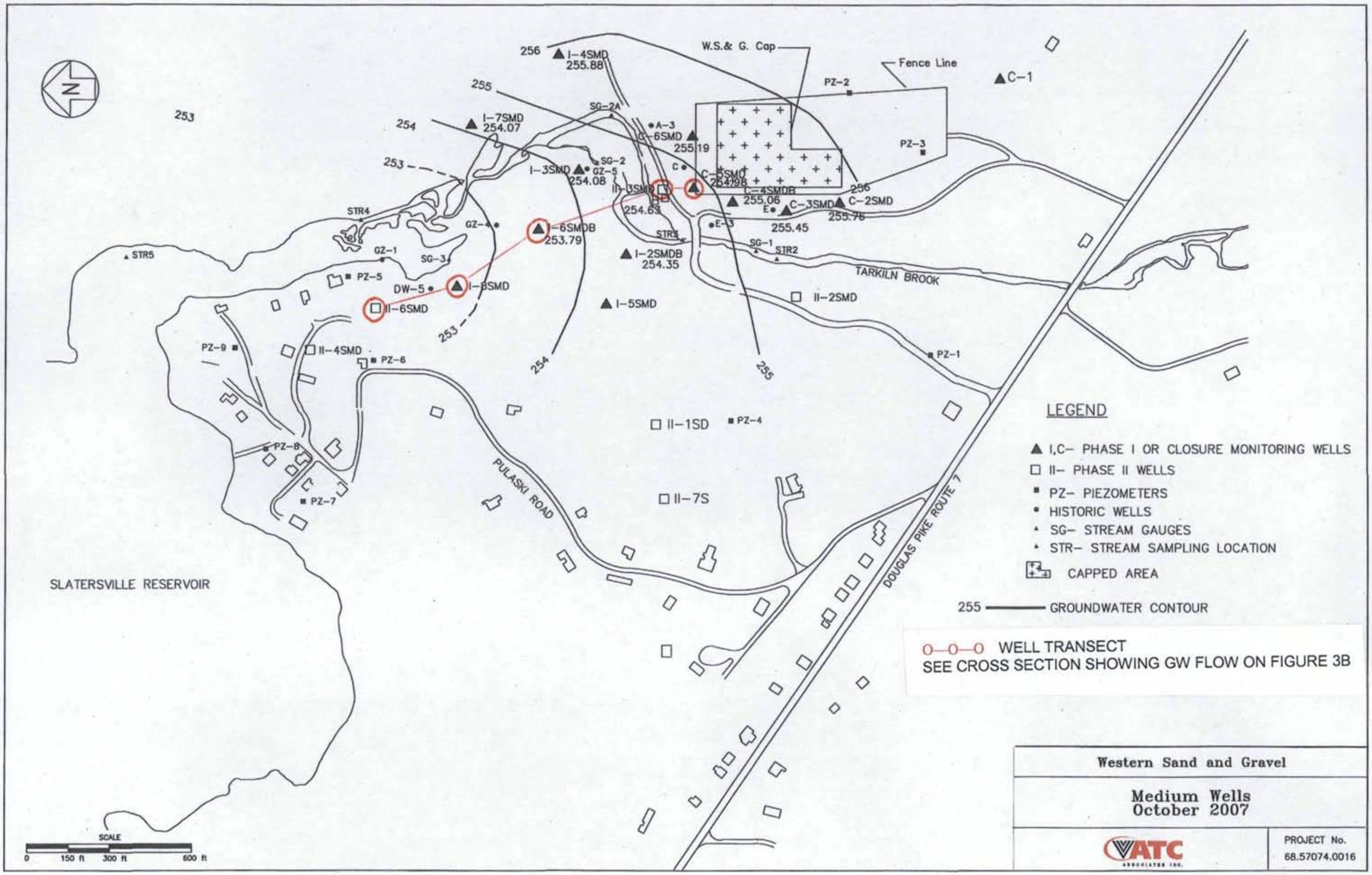
NOTES:

1. WELL SCREEN WIDTHS ARE NOT TO SCALE.
2. FLOW LINE TO TAUPEN BROOK INDICATES BANK RECHARGE
* MEASUREMENTS CALCULATED FROM ELEVATION BETWEEN SC-1 AND SC-2

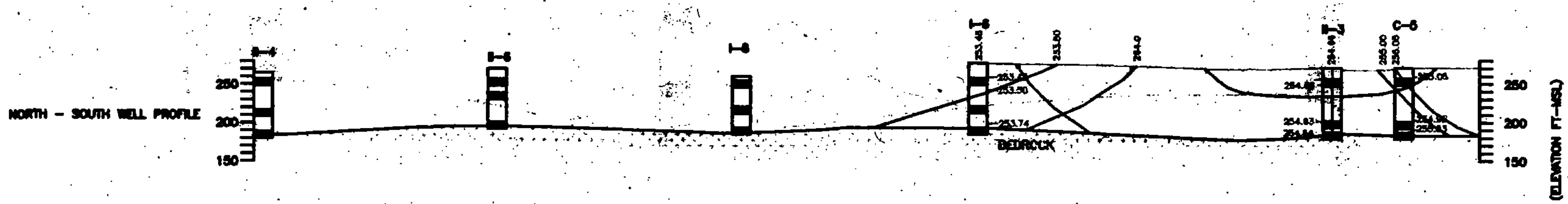
LEGEND

254.5 GROUNDWATER EQUIPOTENTIAL CONTOURS
254.13 GROUNDWATER PIEZOMETRIC LEVELS
GROUNDWATER FLOW DIRECTIONS

FIGURE 3B
OCTOBER 2007



W.S.& G. Cap
Fence Line
C-1
PZ-2
PZ-3
256
I-4SMD
255.88
255
254
253
I-7SMD
254.07
SG-2A
A-3
C-6SMD
255.19
SG-2
GZ-5
I-3SMD
254.08
C
C-5SMD
254.98
II-3SMD
254.63
C-4SMDB
255.06
E
C-3SMD
255.45
C-2SMD
255.76
STR4
STR5
GZ-4
I-6SMDB
253.79
STR3
E-3
SG-1
STR2
I-2SMDB
254.35
GZ-1
SG-3
PZ-5
DW-5
I-8SMD
II-6SMD
I-5SMD
TARKILN BROOK
II-2SMD
PZ-9
II-4SMD
PZ-6
PZ-1
II-1SD
PZ-4
PZ-8
PZ-7
PULASKI ROAD
II-7S
DOUGLAS PIKE ROUTE 7
SLATERSVILLE RESERVOIR
LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
255 GROUNDWATER CONTOUR
O—O—O WELL TRANSECT
SEE CROSS SECTION SHOWING GW FLOW ON FIGURE 3B
SCALE
0 150 ft 300 ft 600 ft
Western Sand and Gravel
Medium Wells
October 2007
PROJECT No.
68.57074.0016



NOTES:

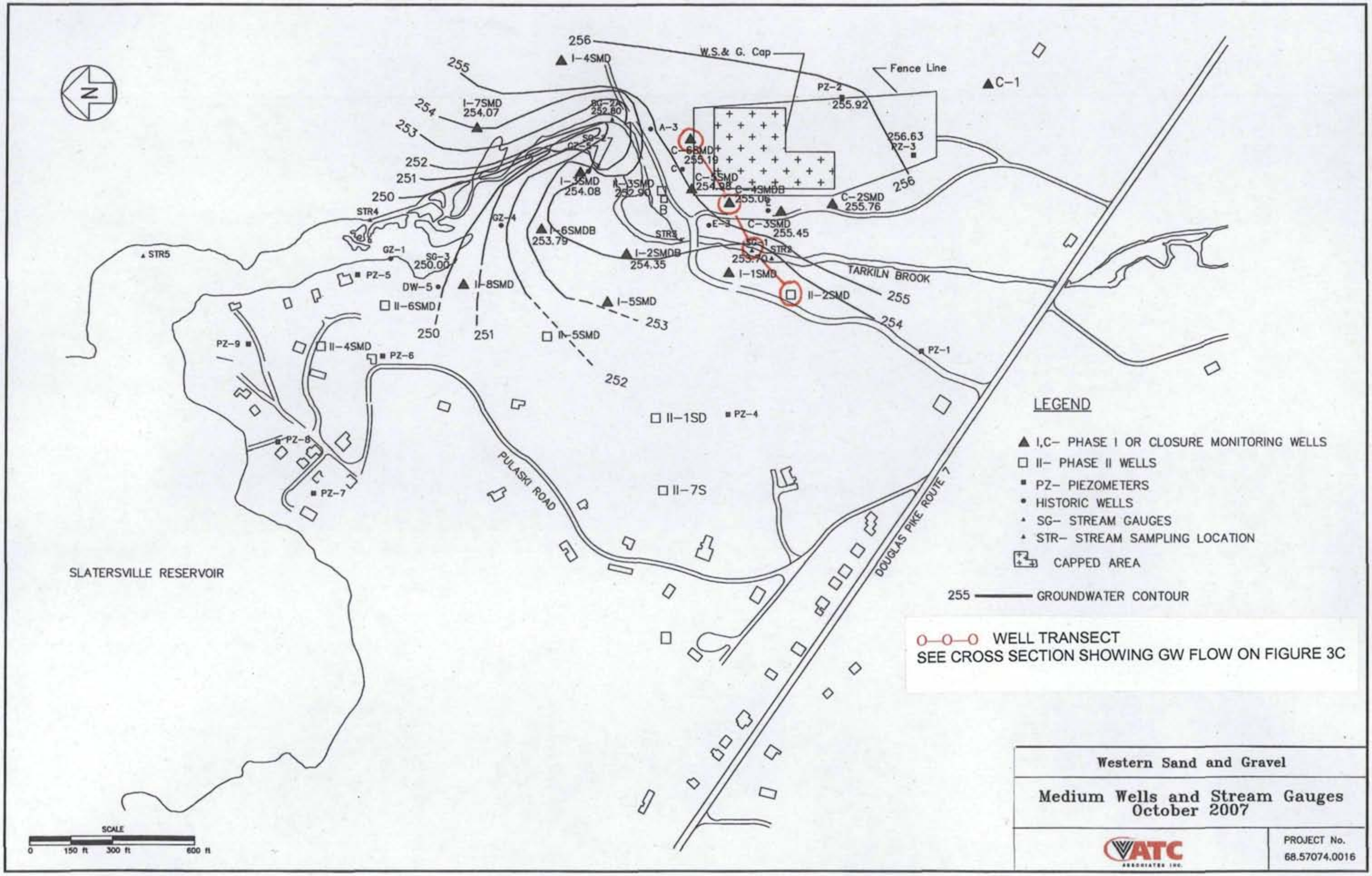
1. WELL SCREEN WIDTHS ARE NOT TO SCALE.
2. FLOW LINE TO TARKILN BROOK INDICATES BANK RECHARGE.

* MEASUREMENTS CALCULATED FROM ELEVATION BETWEEN SG–1 AND SG–2.

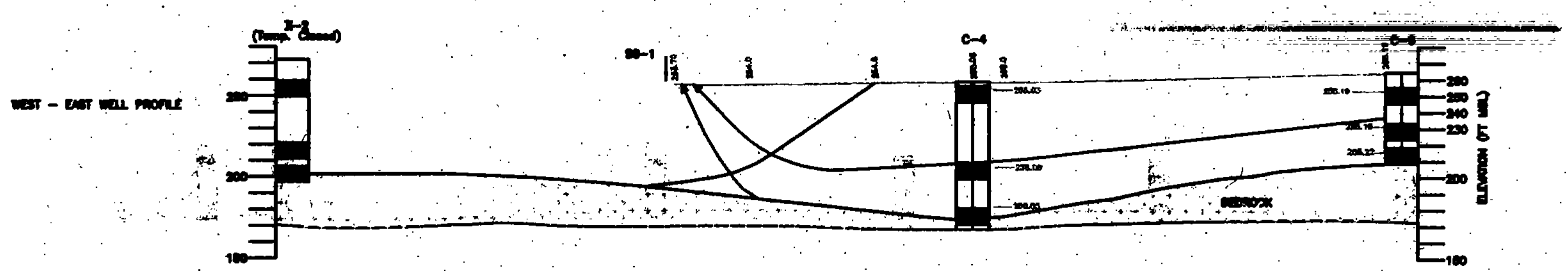
LEGEND

254.5	GROUNDWATER EQUIPOTENTIAL CONTOURS
254.13	GROUNDWATER PIEZOMETRIC LEVELS
←	GROUNDWATER FLOW DIRECTIONS

FIGURE 3B
OCTOBER 2007



256
W.S.& G. Cap
Fence Line
I-4SMD
255
C-1
PZ-2
255.92
254
I-7SMD
254.07
253
A-3
C-6SMD
255.19
256.63
PZ-3
252
251
I-3SMD
254.08
I-3SMD
252.90
C-5SMD
254.98
C-4SMDB
255.06
256
250
C-2SMD
255.76
STR4
GZ-4
C-3SMD
255.45
I-6SMDB
253.79
STR5
GZ-1
SG-3
250.00
I-2SMDB
254.35
I-1SMD
TARKILN BROOK
PZ-5
DW-5
I-8SMD
II-2SMD
255
II-6SMD
I-5SMD
253
254
250
251
II-5SMD
PZ-9
II-4SMD
PZ-6
PZ-1
252
LEGEND
II-1SD
PZ-4
▲ I,C- PHASE I OR CLOSURE MONITORING WELLS
□ II- PHASE II WELLS
PZ-8
■ PZ- PIEZOMETERS
PULASKI ROAD
• HISTORIC WELLS
II-7S
PZ-7
SG- STREAM GAUGES
DOUGLAS PIKE ROUTE 7
STR- STREAM SAMPLING LOCATION
CAPPED AREA
SLATERSVILLE RESERVOIR
255 GROUNDWATER CONTOUR
O—O—O WELL TRANSECT
SEE CROSS SECTION SHOWING GW FLOW ON FIGURE 3C
Western Sand and Gravel
Medium Wells and Stream Gauges
October 2007
SCALE
0 150 ft 300 ft 600 ft
ATC
PROJECT No.
68.57074.0016



NOTES:

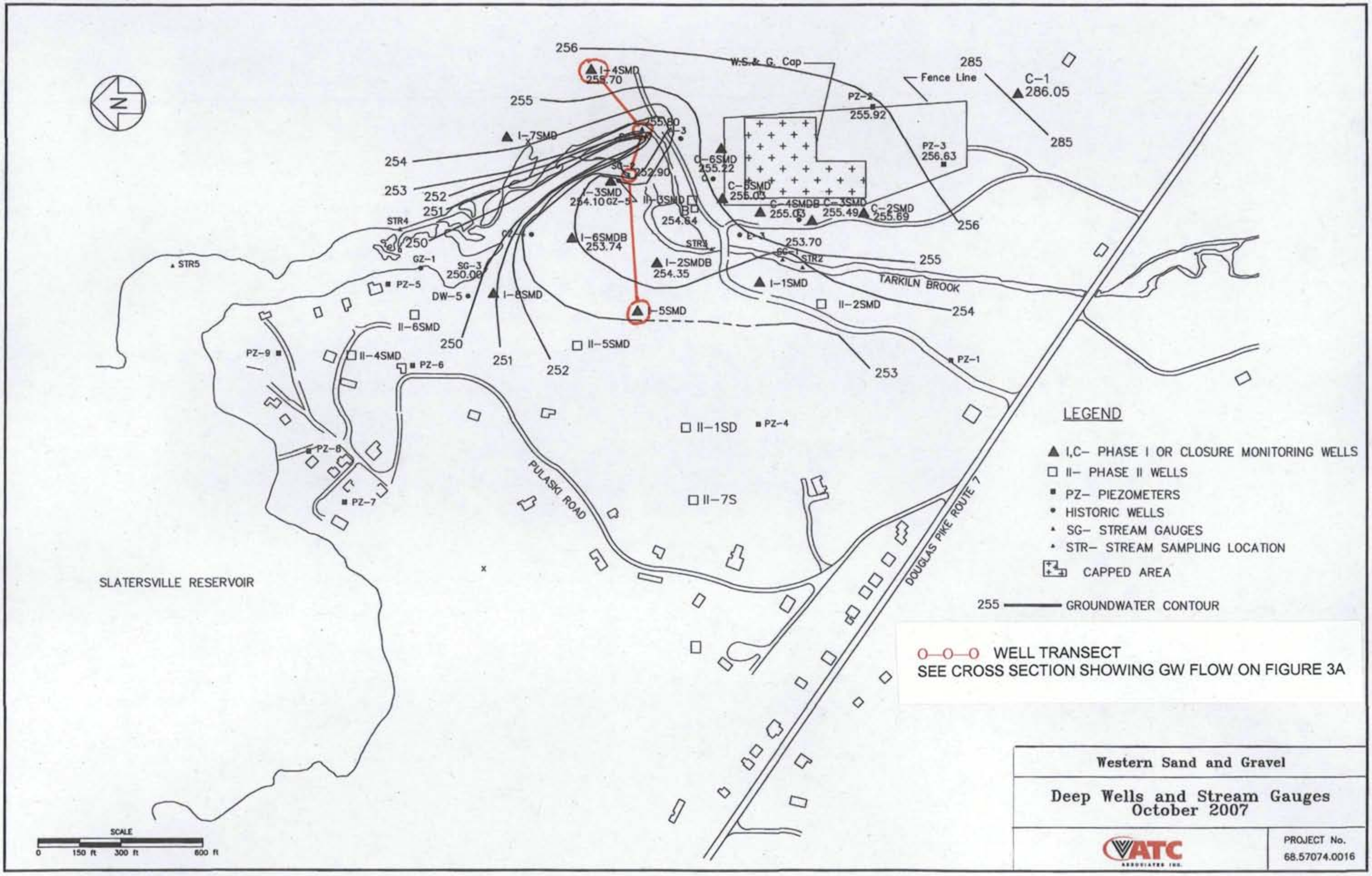
1. WELL SCREEN WIDTHS ARE NOT TO SCALE.
2. FLOW LINE TO TARKILN BROOK INDICATES BANK RECHARGE.

* MEASUREMENTS CALCULATED FROM ELEVATION BETWEEN SG-1 AND SG-2.

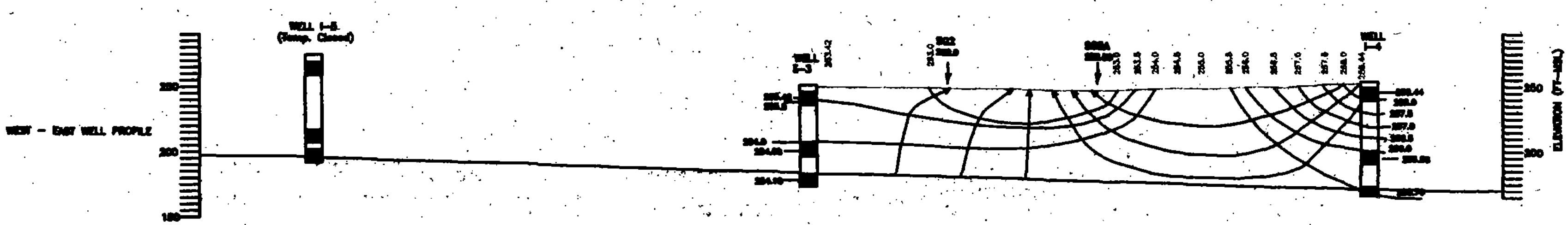
LEGEND

254.5	GROUNDWATER EQUIPOTENTIAL CONTOURS
254.13	GROUNDWATER PIEZOMETRIC LEVELS
←	GROUNDWATER FLOW DIRECTIONS

FIGURE 3C
OCTOBER 2007



LEGEND
I,C- PHASE I OR CLOSURE MONITORING WELLS
II- PHASE II WELLS
PZ- PIEZOMETERS
HISTORIC WELLS
SG- STREAM GAUGES
STR- STREAM SAMPLING LOCATION
CAPPED AREA
255 GROUNDWATER CONTOUR
O—O—O WELL TRANSECT
SEE CROSS SECTION SHOWING GW FLOW ON FIGURE 3A
SLATERSVILLE RESERVOIR
PULASKI ROAD
DOUGLAS PIKE ROUTE 7
TARKILN BROOK
Fence Line
W.S.& G. Cop
C-1 286.05
I-4SMD 255.70
I-7SMD
I-3SMD 254.10
I-6SMDB 253.74
I-2SMDB 254.35
I-8SMD
I-5SMD
I-1SMD
C-6SMD 255.22
C-5SMD 256.03
C-4SMDB 255.03
C-3SMD 255.49
C-2SMD 255.69
PZ-2 255.92
PZ-3 256.63
PZ-1
PZ-4
PZ-5
PZ-6
PZ-7
PZ-8
PZ-9
II-1SD
II-7S
II-2SMD
II-5SMD
II-6SMD
II-4SMD
SG-3 250.00
DW-5
GZ-1
STR4
STR5
STR2
253.70
254.64
252.90
SCALE
0 150 ft 300 ft 600 ft
Western Sand and Gravel
Deep Wells and Stream Gauges October 2007
PROJECT No. 68.57074.0016
ATC ASSOCIATES INC.



NOTES:

1. WELL SCREEN WIDTHS ARE NOT TO SCALE.
2. FLOW LINE TO TARKILN BROOK INDICATES BANK RECHARGE.

* MEASUREMENTS CALCULATED FROM ELEVATION BETWEEN SG-1 AND SG-2.

LEGEND

254.5	GROUNDWATER EQUIPOTENTIAL CONTOURS
254.13	GROUNDWATER PIEZOMETRIC LEVELS
←	GROUNDWATER FLOW DIRECTIONS

FIGURE 3A
OCTOBER 2007

Appendix F
September 2007 Site Inspection Report

ATC ASSOCIATES INC.

October 9, 2007

Mr. James Cashwell
Olin Corporation
P.O. Box 248
1186 Lower River Road
Charleston, TN 37310

RE: September 2007 Site Inspection Report
Western Sand and Gravel Site
Burrillville, Rhode Island
ATC Project No. 68.57074.0016

Dear James:

Attached for your records and distribution, please find seven copies of the September 2007 Site Inspection Report for the cap area at the Western Sand & Gravel site. The inspection was performed during the recent semi-annual groundwater monitoring and sampling event completed at the site during the week of October 1, 2007.

Please do not hesitate to contact us if you have any questions.

Sincerely,

ATC Associates Inc.

Amanda Gibson
Environmental Scientist

Christopher J. Candela
Division Manager
Environmental Management Services

Attachment

WESTERN SAND AND GRAVEL

SITE INSPECTION REPORT

COPY

- GROUNDWATER MONITORING WELL CHECKLIST
- FENCE, GATES, LOCKS AND SIGNS
- REMEDIAL ACTION AREA CHECKLIST
- DRAINAGE SWALES AND STRUCTURES CHECKLIST
- PHOTOGRAPHIC DOCUMENTATION
- SITE MAPS

INSPECTION BY: C. Candela / A. Gibson DATE: 09Oct07

WESTERN SAND AND GRAVEL
GROUNDWATER MONITORING WELL CHECKLIST

Post-closure groundwater monitoring wells show no aboveground physical damage and well caps are locked?

Well Name	Yes	No	Comments		
C-1	X		For C-1, no work within 50 ft radius	Y	N
C-2-S	X				
C-2-M	X				
C-2-D	X				
C-3-S	X				
C-3-M	X				
C-3-D	X				
C-4-S	X				
C-4-M	X				
C-4-D	X				
C-4-B	X				
C-5-S	X				
C-5-M	X				
C-5-D	X				
C-6-S	X				
C-6-M	X				
C-6-D	X				

PROTECTIVE POSTS INTACT?

Well Name	Number	Yes	No	Comments
C-1	2 posts	X		
C-2	4 posts	X		
C-3	4 posts	X		
C-4	4 posts	X		
C-5	4 posts	X		
C-6	4 posts	X		

* Other comments, e.g., significant listing of protective casing; protective posts damaged; well name illegible, etc.

SIGNATURE: [signature] DATE: 10/9/07

WESTERN SAND AND GRAVEL
FENCE, GATES, LOCKS AND SIGNS CHECKLIST

	Fence & Posts intact; chainlink & barbed wire	No erosion gaps under fence*	Number of signs to be on fence	Signs intact, legible, free of damage	Gate intact and locked	Comments
South	X	X	1 on fence, 1 on gate	X	X	
Southwest	X	X	2	X	No gate	
West	X	X	2	X	No gate	
North	X	X	2 on fence, 1 on gate	X	X	
East	NO	X	4	X	No gate	Fence rail separated

X means YES

Notes: Is surveyed benchmark intact? YES X NO ____
Vegetation adequate to prevent erosion at fence? YES X NO ____

Other comments:
Inserted fence rail ends back into coupling.

SIGNATURE: Amanda Gibson DATE: 10/9/07

WESTERN SAND AND GRAVEL
REMEDIAL ACTION AREA CHECKLIST

	No settling or subsidence (adequate drainage)	No erosion damage (or frost heave damage)	Good vegetation	Comments*
Cap area	X	X	**NO***	**August 2006 repairs are adequate**
West bank area	X	X	X	
Area south of south drainage swale	X	X	X	
Other areas	X	X	X	

X means YES

* Comments, e.g., grass height, evidence of burrowing animals, etc.
There were several areas of limited vegetative cover growth. ATC reseeded and mulched 12 areas - see Photos.

Draw any areas of poor vegetation, etc, on map.
Draw any significant erosion channels on map and describe (depth, width, vegetation, etc.)

SIGNATURE: [signature] DATE: 10/9/07

WESTERN SAND AND GRAVEL CHECKLIST
DRAINAGE SWALES

DRAINAGE SWALES

	No settling or subsidence* (proper drainage)	No erosion damage (or frost heave damage)**	Good vegetation in swale (but not overgrown so as to restrict water flow)	Comments
SOUTH	X	X	X	
EAST	X	X	X	
NORTH	X	X	X	

DRAINAGE STRUCTURES

	No settling or subsidence* (proper drainage)	No erosion damage (or frost heave damage)**	Rip-rap intact	Comments
SOUTH A	X	X	X	
SOUTH B	X	X	X	
SOUTH C***	X	X	X	
NORTHEAST	X	X	X	
NORTHWEST	X	X	X	

X means YES

* e.g., no low spots or ponding of water in swale or structure
** e.g., sides of swale/structure are intact, no erosional breakouts allowing water to flow away from swale/structure centerline
*** South C drainage structure is not critical to cap integrity

SIGNATURE: Amanda Gilis DATE: 10/9/07

WESTERN SAND AND GRAVEL CHECKLIST
PHOTOGRAPHIC DOCUMENTATION

Photo 1: View of the southern gate, facing the cap.

Photo 2: View of PZ-3.

Photo 3: View of PZ-2.

Photo 4: View of the benchmark.

Photo 5: View across the cap, facing north.

Photo 6: View across the cap, facing east.

Photo 7: View across the cap, facing south.

Photo 8: View across the cap, facing west.

Photo 9: View of the eastern drainage swale.

Photo 10: View of the northern drainage swale.

Photo 11: View of the southern drainage swale.

Photo 12: View of subsidence repair area.

Photo 13: View of subsidence repair area.

Photo 14: View of subsidence repair area.

Photo 15: View of typical area of limited vegetative cover growth observed on the cap.

Photo 16: View of typical area of limited vegetative cover growth observed on the cap after seeding and mulching.

Appendix G
Photographic Summary of Site Conditions

Photo 1: View of the fence line facing north

Photo 2: View of PZ-2

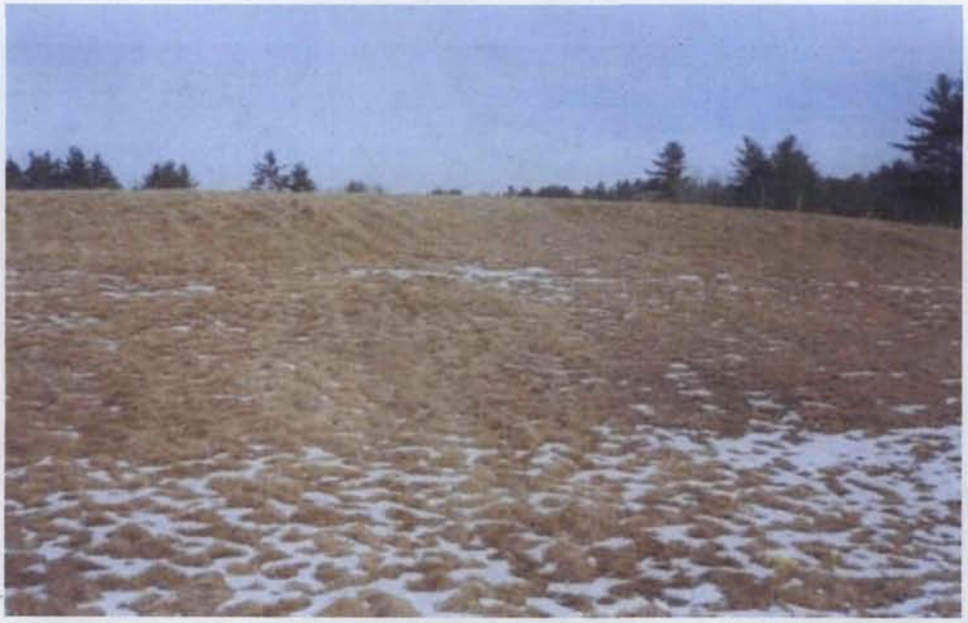


Photo 3: View of the cap facing north

Photo 4 View of the cap facing south-east

Photo5: View of the cap and fence line from the interior

Photo 6: View of PZ-3

Figure 7: View of the southern gate facing north

Appendix H
COCs per ROD for OU III

TABLE 15
WESTERN SAND & GRAVEL SITE
SELECTED GROUNDWATER INTERIM CLEANUP LEVELS

Chemical	Reference Dose(oral) (mg/kg/day)	Carc. Potency Factor(oral) (mg/kg/day)-1	Int Cleanup Level (mg/L)	Basis	Cancer Risk Level	Noncancer Hazard Index	Noncancer Target Endpoint
(Volatile Organics)							
Acetone	1.0E-01	-	3.5E+00	HB	-	1.0E+00	liver, kidney
Benzene	-	2.9E-02	5.0E-03	MCL	4.2E-06	-	
2-Butanone	5.0E-02	-	1.8E+00	HB	-	1.0E+00	fetotoxicity
Chlorobenzene	2.0E-02	-	1.0E-01	PMCLG	-	1.5E-01	liver, kidney
Chloroform*	1.0E-02	6.1E-03	1.0E-01	MCL	1.8E-05	2.9E-01	liver
Chloromethane	-	1.3E-02	3.0E-03	RB	1.1E-06	-	
1,1-Dichloroethane	1.0E-01	-	3.5E+00	HB	-	1.0E+00	none
1,2-Dichloroethane		9.1E-02	5.0E-03	MCL	1.3E-05	-	
1,1-Dichloroethene	9.0E-03	6.0E-01	7.0E-03	MCL	1.2E-04	2.3E-02	liver
1,2-Dichloroethene (1)	2.0E-02	-	7.0E-02	PMCLG	-	1.0E-01	blood
Ethylbenzene	1.0E-01	-	7.0E-01	PMCLG	-	2.0E-01	liver, kidney
Methylene Chloride	6.0E-02	7.5E-03	5.0E-03	MCL	1.1E-06	2.4E-03	liver
4-Methyl-2-pentanone	5.0E-02	-	1.8E+00	HB	-	1.0E+00	liver, kidney
Tetrachloroethene	1.0E-02	5.1E-02	5.0E-03	MCL	7.4E-06	1.5E-02	liver
Toluene	2.0E-01	-	1.0E+00	MCL	-	1.5E-01	organ weight
trans-1,3-Dichloropropene	3.0E-04	1.8E-01	5.0E-03	DL	2.6E-05	4.8E-01	organ weight
1,1,1-Trichloroethane	9.0E-02	-	2.0E-01	MCLG	-	6.4E-02	liver
1,1,2-Trichloroethane	4.0E-03	5.7E-02	3.0E-03	PMCLG	5.0E-06	2.2E-02	clinical chem.
Trichloroethene	-	1.1E-02	5.0E-03	MCL	1.6E-06	-	
Xylene	2.0E+00	-	1.0E+01	PMCLG	-	1.5E-01	body weight, mortality
Vinyl chloride	-	1.9E+00	2.0E-03	MCL	1.1E-04	-	
Bromomethane	1.4E-03	-	3.5E-02	HB	-	7.3E-01	stomach
1,1,2,2-Tetrachloroethane	-	2.0E-01	1.0E-03	DL	-	-	
Chloroethane	-	-	1.4E+01	HB*	-	1.0E+00	blood, CNS
Acrolein	-	-	-	CNA	-	-	
Trichlorofluromethane	3.0E-01	-	1.0E+01	HB	-	9.7E-01	mortality

TABLE 15 - CONTINUED
WESTERN SAND & GRAVEL SITE
SELECTED GROUNDWATER INTERIM CLEANUP LEVELS

Chemical	Reference Dose(oral) (mg/kg/day)	Carc. Potency Factor(oral) (mg/kg/day)-1	Int Cleanup Level (mg/L)	Basis	Cancer Risk Level	Noncancer Hazard Index	Noncancer Target Endpoint
(Semivolatiles)							
Benzoic acid	4.0E+00	-	1.4E+02	HB	-	1.0E+00	irritation, malais
bis(2-ethylhexyl)phthalate	2.0E-02	1.4E-02	4.0E-03	PMCL	1.6E-06	5.8E-03	liver
Isophorone	2.0E-01	4.1E-03	8.4E-03	RB	1.0E-06	1.2E-03	kidney
2-Methylnaphthalene	-	-	-	CNA	-	-	
4-Methylphenol	5.0E-02	-	1.8E-01	HB	-	1.0E-01	neurotoxicity
Napthalene	4.0E-03	-	1.4E-01	HB	-	1.0E+00	body weight
N-nitrosodiphenylamine	-	4.9E-03	1.0E-02	DL	1.4E-06	-	
1,2,4-Trichlorobenzene	1.3E-03	-	9.0E-03	PMCLG	-	2.0E-01	blood
1,2-Dichlorobenzene	9.0E-02	-	6.0E-01	PMCLG	-	1.9E-01	liver
1,4-Dichlorobenzene	-	2.4E-02	7.5E-02	MCLG	5.2E-05	-	
Di-n-octyl phthalate	2.0E-02	-	7.0E-01	HB	-	1.0E+00	liver, kidney
Di-n-butyl phthalate	1.0E-01	-	4.0E-03	PMCL	-	1.2E-03	mortality
(Metals)							
Aluminum	-	-	5.0E-02	SMCL	-	-	
Barium .	7.0E-02	-	1.0E+00	PMCLG	-	4.1E-01	blood pressure
Cobalt	-	-	-	CNA	-	-	
Lead	-	-	5.0E-03	PMCL	-	-	
Nickel	2.0E-02	-	1.0E-01	PMCLG	-	1.5E-01	body, organ weight
Silver	3.0E-03	-	9.0E-02	SMCL	-	8.7E-01	argyria-skin
Zinc	2.0E-01	-	5.0E+00	SMCL	-	7.3E-01	blood
				Total	3.7E-04	Weight Change: 6.1E+00 Liver: 4.1E+00 Kidney: 2.5E+00 Blood: 2.4E+00 Mortality: 1.1E+00	

TABLE 15 - CONTINUED
WESTERN SAND & GRAVEL SITE
SELECTED GROUNDWATER INTERIM CLEANUP LEVELS

NOTES

MCL - Maximum Contaminant Level
PMCL - Proposed Maximum Contaminant Level
MCLG - Maximum Contaminant Level Goal
PMCLG - Proposed Maximum Contaminant Level Goal
SMCL - Secondary Maximum Contaminant Level
RB - Risk Based (carcinogens)
HB - Hazard Based (noncarcinogens)
HB* - The clean-up level for chloroethane is based on the RfD for chlorobutane.
A structural similarity is assumed.
CNA - Criteria Not Available
RSD - Risk Specific Dose
DL - Detection Limit
Chloroform* - The MCL for total trihalomethanes was used for chloroform.

(1) Since the specific 1,2-Dichlorothene isomer was not identified in the RI Report, the MCL for the cis" isomer is cited. The cleanup level may be overprotective if the isomer detected is the "trans" isomer.

Appendix I
Public Notice – Start of 5YR Review

IN BRIEF

Valley Singers available to perform

CUMBERLAND — In 1989, **Robert and Janet McIntyre** established The Valley Singers and Entertainers, a group of volunteers from cities and towns in the Blackstone Valley and surrounding areas.

For 18 years, even without his wife, who died in 2005, Robert McIntyre continues to serve as founder and director. He also performs with the group.

The singers have had shows in church halls, elderly highrises, nursing homes, assisted living houses and senior clubs, and most recently performed at Lincoln Place, Emerald Bay Manor and St. Basil the Great Church Hall. Bookers may also request a specific theme for the show. For example, this month, the singers will be doing many Irish-themed shows.

The group's officers are **Robert McIntyre**, director; **Dixie Vollett**, assistant director; **Thelma Wunschel**, treasurer; **Loretta Bergeron**, music librarian; and **Susan Silva**, music coordinator.

For a booking date, contact Vollett at (401) 726-4622 or McIntyre at (401) 333-0178.

The Valley Singers welcome volunteers such as banjo, guitar or harmonica players. Practices are held on Saturday mornings at St. Joseph Hall on Mendon Road.

CYO Center to host chowder dinner

WOONSOCKET — The Board of Directors and Youth Leadership Team of the Father Marot CYO Center, 53 Federal St., will hold an all-you-can-eat chowder and clam cake dinner on Friday from 4:30 p.m. to 7:30 p.m. at the center. Donation is $7, children under 12, $5. Tickets will be sold at the door.

Toastmasters group slates meetings

LINCOLN — Saturday Brunch Bunch Toastmasters, a Toastmasters International ... has set its

POLICE BLOTTER

WOONSOCKET

■ Police charged two men with possession of a stolen automobile and possession of burglary tools after they were located in the car following a motor vehicle stop at 1:15 a.m. Saturday.

Police checking the vehicle during the stop at Main and Cato streets observed the ignition of the vehicle on the floor near the driver's feet, police said.

The operator, Joseph Santana, 27, of Providence, was also charged with operating on a suspended license, police said. The passenger, who was also charged with possession of a stolen motor vehicle, was identified by police as Alexander Trinidad, 27, of Providence.

LINCOLN

■ A 58-year-old Providence woman was permanently ejected from Twin River shortly after 11:30 p.m. Friday, police stated.

Diana Rolle, of 1271 Eddy St., allegedly took a ticket out of someone else's video display terminal and cashed it. When Patrolman Edward Walusiak confronted her, she admitted to the theft and agreed to pay back the total amount of $498, police said.

Casino officials didn't wish to pursue charges, but permanently barred her from the premises.